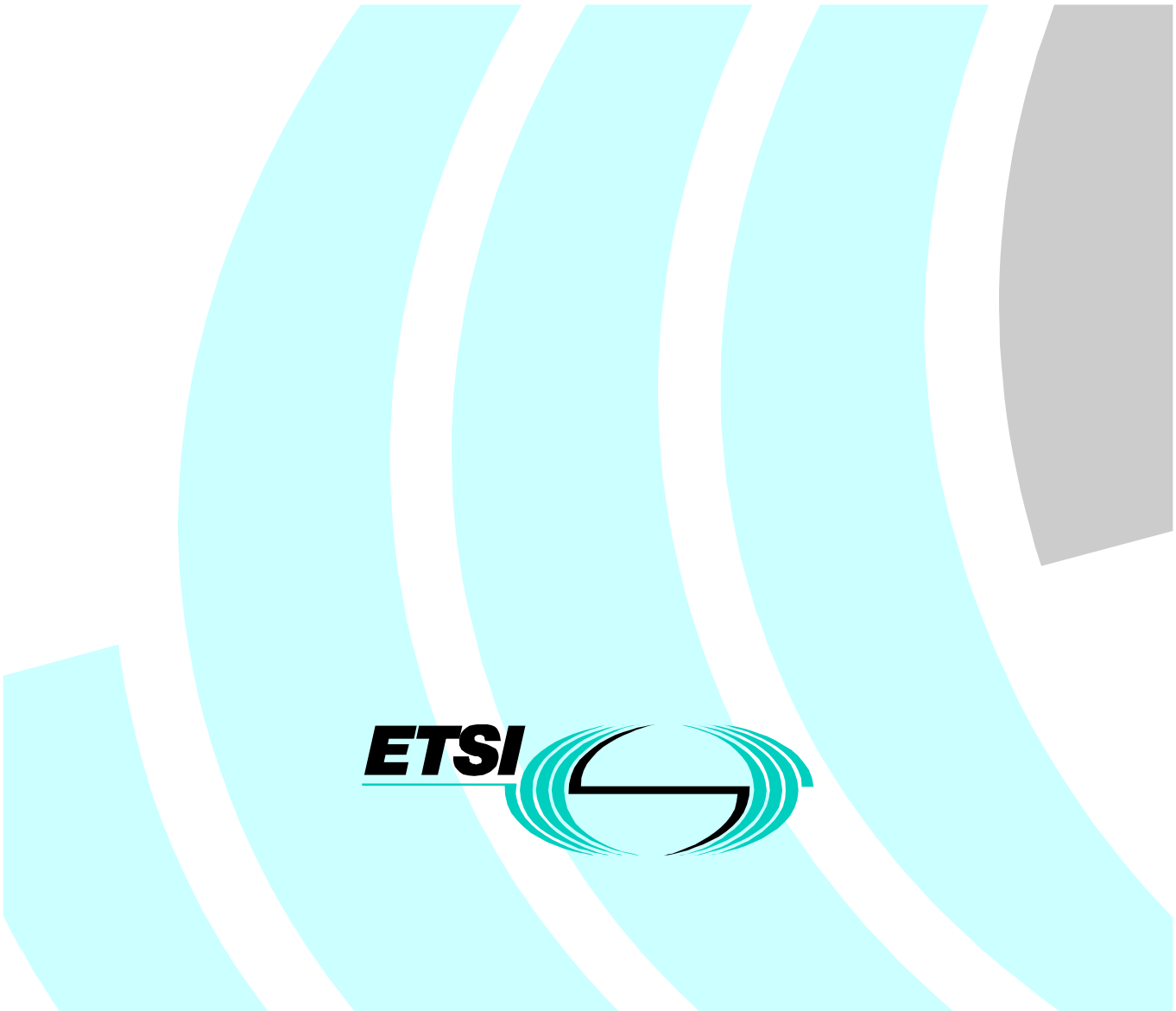
EN 301 065-1 V1.2.2 (1998-10)

European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Completion of Calls on No Reply (CCNR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification



Reference
DEN/SPS-05115-1 (9v090ipc.PDF)

Keywords
ISDN, DSS1, supplementary service, CCNR

ETSI

Postal address
F-06921 Sophia Antipolis Cedex - FRANCE

Office address
650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet
secretariat@etsi.fr
http://www.etsi.org

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1998.
All rights reserved.

Contents

Intellectual Property Rights 5
Foreword 5
1 Scope 7
2 Normative references 7
3 Definitions 8
4 Abbreviations 10
5 Description 10
6 Operational requirements 10
6.1 Provision and withdrawal 10
6.2 Requirements on the network A side 11
6.3 Requirements on the network B side 11
7 Coding requirements 11
8 State definitions 14
8.1 User A states 14
8.2 User B states 14
8.3 Network A states 14
8.4 Network B states 14
9 Signalling procedures at the coincident S and T reference point 14
9.1 Activation 14
9.1.1 Normal operation 14
9.1.2 Exceptional procedures 16
9.2 User initiated deactivation procedure 17
9.3 Interrogation 17
9.3.1 General interrogation 17
9.3.1.1 Normal operation 17
9.3.1.2 Exceptional procedures 18
9.3.2 Specific interrogation 18
9.3.2.1 Normal operation 18
9.3.2.2 Exceptional procedures 18
9.4 Invocation and operation 19
9.4.1 Recall indication 19
9.4.1.1 Normal operation 19
9.4.1.2 Exceptional procedures 19
9.4.2 CCNR call request 20
9.4.3 CCNR call establishment 20
9.4.4 Network initiated deactivation procedures 20
9.4.5 B free but A busy procedure 20
9.4.5.1 Normal operation 20
9.4.5.2 Exceptional procedures 20
9.4.6 User A monitoring procedure 21
9.4.6.1 Normal operation 21
9.4.6.2 Exceptional procedures 21
9.5 Procedures at network B 21
9.5.1 Determination that CCNR is available 21
9.5.1.1 Normal operation 21
9.5.1.2 Exceptional procedures 21
9.5.2 Acceptance of a CCNR request 22
9.5.3 Queue B processing 22
9.5.3.1 Normal operation 22
9.5.3.2 Exceptional procedures 22

9.5.4 Determination of user B free 22
9.5.5 CCNR call 22
9.6 Call information retention 22
9.6.1 Normal operation 23
9.6.2 Exceptional procedures 23
9.7 Basic call information and compatibility checking at user A 23

10 Procedures for interworking with private ISDNs 24
10.1 Procedures for the originating T reference point 24
10.1.1 CCNR available indication 24
10.1.1.1 Normal operation 24
10.1.1.2 Exceptional procedures 24
10.1.2 CCNR supplementary service request 24
10.1.2.1 Normal operation 24
10.1.2.2 Exceptional procedures 25
10.1.3 User B free indication 25
10.1.4 Suspend request 25
10.1.5 Resume request 25
10.1.6 CCNR call establishment 25
10.1.7 Deactivation 25
10.2 Procedures for the destination T reference point 26
10.2.1 CCNR available indication 26
10.2.1.1 Normal operation 26
10.2.1.2 Exceptional procedures 26
10.2.2 CCNR supplementary service request 26
10.2.2.1 Normal operation 26
10.2.2.2 Exceptional procedures 26
10.2.3 User B free indication 27
10.2.3A Normal operation 27
10.2.4 Suspend request 27
10.2.5 Resume request 27
10.2.6 CCNR call establishment 27
10.2.7 Deactivation 27

11 Interactions with other networks 27

12 Interactions with other supplementary services 27

13 Parameter values (timers) 28

14 Dynamic description (SDL diagrams) 29

Annex A (informative): CCNR signalling flows 73

Annex B (normative): Provision of status request procedures 81

Annex C (informative): Assignment of object identifier values 82

History 83

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available **free of charge** from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.fr/ipr or http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS).

The present document is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Completion of Calls on No Reply (CCNR) supplementary service, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European ISDN:

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

The present document details the stage 3 aspects (signalling system protocols and switching functions) needed to support the CCNR supplementary service. The stage 1 aspects are detailed in EN 301 134.

NOTE: Currently no stage 2 document exists.

National transposition dates	
Date of adoption of this EN:	9 October 1998
Date of latest announcement of this EN (doa):	31 January 1999
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 1999
Date of withdrawal of any conflicting National Standard (dow):	31 July 1999

1 Scope

This first part of EN 301 065 specifies the stage three of the Completion of Calls on No Reply (CCNR) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [6]) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol. Stage three identifies the protocol procedures and switching functions needed to support a telecommunication service (see CCITT Recommendation I.130 [3]).

In addition, the present document specifies the protocol requirements at the T reference point where the service is provided to the user via an intermediate private ISDN.

The present document does not specify the additional protocol requirements where the service is provided to the user via a telecommunications network that is not an ISDN.

The CCNR supplementary service enables user A, encountering a destination B, which does not answer the call, to have the call completed without having to make a new call attempt when the destination B becomes not busy after having initiated an activity .

The CCNR supplementary service is applicable to all circuit-switched telecommunication services with the following exceptions:

a) call 2 of the videotelephony teleservice;

b) call 2 of the audiographic conference teleservice;

c) call 2 and subsequent calls of videoconference teleservice;

d) all other circuit-switched telecommunication services requiring the use of more than one B-channel.

Further parts of EN 301 065 specify the method of testing required to identify conformance to the present document.

The present document is applicable to equipment supporting the CCNR supplementary service, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

2 Normative references

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".

[2] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[3] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[4] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[5] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

[6] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces; Reference configurations".

[7] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

[8] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[9] CCITT Recommendation X.219 (1988): "Remote Operations: Model, notation and service definition".

[10] CCITT Recommendation Z.100 (1993): "Specification and Description Language (SDL)".

[11] EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[12] ETS 300 403-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 2: Specification and Description Language (SDL) diagrams".

[13] EN 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[14] EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[15] EN 300 359-1: "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

3 Definitions

For the purposes of the present document, the following definitions apply:

activity: the activity condition applies, if at least one CCNR request is in queue B and any user at destination B either:

- initiates an outgoing call with a SETUP message; or,
- answers an incoming call with a CONNECT message; or
- clears an established call; or,
- clears an outgoing call.

busy: See ITU-T Recommendation I.221 [5], subclause 2.1.5.

call: See CCITT Recommendation Q.9 [7], definition 2201.

call information retention: A procedure of network A to store the call information of a specific call so that it can be used for that call.

call state: A state as defined in EN 300 403-1 [11], subclause 2.1 for either the user or the network as appropriate. A call state may exist for each call reference value (and for each additional responding CEI in the incoming call states).

CCNR busy: Any one of the following conditions will cause a CCNR busy condition:

- maximum number of calls reached at user A (see ITU-T Recommendation I.221 [5], subclause 2.1.3, item 2);
- no B-channels available at user A;
- CCNR or CCBS recall pending on user A.

CCNR call: A call which is established under the control of the CCNR supplementary service.

CCNR recall: The procedure where user A is requested to complete the communication when user B ceases to be busy after having initiated an activity.

CCBS request retention: If an attempt to establish a CCNR call fails because the destination is busy, then the network provider option "CCBS request retention" defines whether the CCNR supplementary service shall continue or not, i.e. if the "CCBS request retention" is supported, the original CCNR request shall retain its position in the queue B, and monitoring of user B shall continue. Otherwise, on receiving an indication that user alerting has been initiated at the called address the CCNR request will be deactivated.

destination B: The entity addressed in the original call.

existing service: The basic telecommunication service associated with speech, 3,1 kHz audio and 64 kbit/s unrestricted bearer capabilities.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [2], definition 308.

ISDN number: A number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [1].

invoke component: See EN 300 196-1 [14], subclause 8.2.2.1. Where reference is made to an "xxxx" invoke component, an invoke component is meant with its operation value set to the value of the operation "xxxx".

network: The DSS1 protocol entity at the network side of the user-network interface.

network A: The network, at the coincident S and T reference point, to which user A is attached.

network B: The network, at the coincident S and T reference point, which is identified as destination B.

private network: The DSS1 protocol entity at the user side of the user-network interface at the T reference point.

public network: The DSS1 protocol entity at the network side of the user-network interface at the T reference point.

queue A: A buffer at network A for the control of CCNR requests associated with user A, provided on a per-ISDN number basis.

queue B: A buffer at network B for the control of CCNR requests associated with destination B. Resource is provided in the buffer for each ISDN number, but the buffer is processed on a per-access basis. The buffer is used to support the monitoring of user B to become not busy after having initiated an activity.

reject component: See EN 300 196-1 [14], subclause 8.2.2.4.

return error component: See EN 300 196-1 [14], subclause 8.2.2.3. Where reference is made to an "xxxx" return error component, a return error component is meant which is related to an "xxxx" invoke component.

return result component: See EN 300 196-1 [14], subclause 8.2.2.2. Where reference is made to an "xxxx" return result component, a return result component is meant which is related to an "xxxx" invoke component.

service; telecommunication service: See ITU-T Recommendation I.112 [2], definition 201.

supplementary service: See ITU-T Recommendation I.210 [4], subclause 2.4.

user: The DSS1 protocol entity at the user side of the user-network interface.

user A: The user, at the coincident S and T reference point, who originated the call and to whom the CCNR supplementary service is provided.

user B: The user, at the coincident S and T reference point, which is identified as destination B.

4 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ASN.1	Abstract Syntax Notation One
CCBS	Completion of Calls to Busy Subscriber
CCNR	Completion of Calls on No Reply
DCR	Dummy Call Reference
DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network

5 Description

The CCNR supplementary service enables user A, encountering a destination B, which does not answer the call, to have the call completed without having to make a new call attempt when the destination B becomes not busy after having initiated an activity. User A can request the CCNR supplementary service when the call is in the alerting phase and after call clearing during the alerting phase before the retention timer is expired.

When user A requests the CCNR supplementary service, the network B will monitor destination B for becoming not busy after having initiated an activity.

When the destination B becomes not busy, (i.e. access resources e.g. one B-channel are not busy) after having initiated an activity, then the network will wait a short time in order to allow the resources to be reused for originating a call. If the resources are not reused within this time by destination B, then the network B will automatically recall user A.

When user A accepts the CCNR recall, then network A will automatically generate a CCNR call to destination B.

NOTE: The procedures for the CCNR supplementary service are similar to the procedures specified in the CCBS standard. Therefore, where possible, the terms (e.g. CCBSReference parameter) as defined for the CCBS supplementary service are used and in some cases a reference to the subclauses in EN 300 359-1 [15] is made.

6 Operational requirements

6.1 Provision and withdrawal

CCNR may be provided to subscribers by the network provider on a subscription basis or may be generally available. Withdrawal may happen on subscriber's request or for administrative reasons.

As a network option, the CCNR supplementary service can be offered with a subscription option which shall apply to the whole access of user A.

Table 1 summarizes the subscription options for the CCNR supplementary service.

Table 1: Subscription option

Subscription option	Value	Meaning
Recall mode	Global recall	CCNR recall offered to all compatible terminals.
	Specific recall	CCNR recall offered to the terminal which has activated the CCNR supplementary service.

If the subscription option is not offered, one of the two values shall be chosen by the network provider.

Table 2 summarizes the network options which apply to the CCNR supplementary service.

Table 2: Network options

Network option	Value	Meaning
Check for identical calls (note)	Yes	The network checks if CCNR is requested for a call identical to a call for which CCNR is already activated.
	No	The network does not check if CCNR is requested for a call identical to a call for which CCNR is already activated.
CCBS request retention (note)	Yes	User A's CCNR request is continued if user B is busy.
	No	User A's CCNR request does not continue if user B is busy.
NOTE: Regarding this network option, refer to EN 300 195-1 [13], for further details on the CCNR and CCBS supplementary service interactions and the correlation between this option and the equivalent option in the CCBS specification.		

6.2 Requirements on the network A side

The network A side shall register whether the CCNR supplementary service specific functions have to be performed in network A or in an attached private ISDN.

6.3 Requirements on the network B side

The network B side shall register whether the CCNR supplementary service specific functions have to be performed in the network B or in an attached private ISDN.

7 Coding requirements

Tables 3 and 4 show the definition of the operations and errors required for the CCNR supplementary service using Abstract Syntax Notation one (ASN.1) as defined in CCITT Recommendation X.208 [8] and using the OPERATION and ERROR macro as defined in CCITT Recommendation X.219 [9], figure 4/X.219.

The formal definition of the component types to encode these operations is provided in EN 300 196-1 [14], annex D, clause D.1.

The inclusion of components in Facility information elements is defined in EN 300 196-1 [14], subclause 11.2.2.1.

All components (invoke, return result, return error and reject) shall be included within a Facility information element. This Facility information element may be included in any appropriate message as specified in EN 300 196-1 [14], subclause 8.3.1.1, unless a more restrictive specification is given in clause 9.

For all ASN.1 components (i.e. operations, parameters and error values) with the exception of:

- the CCNRRequest invoke component;
- the CCNRInterrogate invoke component; and
- the CCNR-T-Request invoke component,

the same terms and values (object identifiers) as defined in EN 300 359-1 [15] are used.

Table 3: Operation and error definitions for the CCNR supplementary service at the coincident S and T reference point

```
CCNR-Operations-and-Errors {ccitt identified-organization etsi(0) 1065 operations-and-errors(1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

EXPORTS             CCNRRequest, CCNRInterrogate
;
IMPORTS             OPERATION, ERROR
                    FROM Remote-Operation-Notation
                        {joint-iso-ccitt remote-operations(4) notation(0)}

                    notSubscribed, supplementaryServiceInteractionNotAllowed
                    FROM General-Errors
                        {ccitt identified-organization etsi(0) 196 general-errors(2)}

                    PartyNumber, PartySubaddress
                    FROM Addressing-Data-Elements
                        {ccitt identified-organization etsi(0) 196 addressing-data-elements(6)}

                    CallInfoRetain, CCBSDeactivate, CCBSErase, CCBSRemoteUserFree, CCBSCall,
                    CCBSStatusRequest, CCBSBFree, CCBSStopAlerting, InvalidCCBSReference,
                    EraseCallLinkageID, InvalidCallLinkageID, LongTermDenial,ShortTermDenial,
                    CCBSIsAlreadyActivated, AlreadyAccepted, OutgoingCCBSQueueFull,
                    NotReadyForCall, CallDetails, CallInformation, CallLinkageID, CCBSReference,
                    RecallMode
                    FROM CCBS-Operations-and-Errors
                        {ccitt identified-organization etsi(0) 359 operations-and-errors(1)}
;

CCNRRequest                 ::= OPERATION
                                ARGUMENT    callLinkageID       CallLinkageID
                                RESULT SEQUENCE {
                                            recallMode          RecallMode,
                                            cCBSReference       CCBSReference}
                                ERRORS     {notSubscribed, InvalidCallLinkageID, ShortTermDenial,
                                            LongTermDenial, CCBSIsAlreadyActivated,
                                            supplementaryServiceInteractionNotAllowed,
                                            OutgoingCCBSQueueFull}

CCNRInterrogate             ::= OPERATION
                                ARGUMENT SEQUENCE {
                                            cCBSReference       CCBSReference OPTIONAL,
                                            partyNumberOfA      PartyNumber OPTIONAL}
                                RESULT SEQUENCE {
                                            recallMode          RecallMode,
                                            callDetails         CallDetails OPTIONAL}
                                ERRORS     {InvalidCCBSReference, notSubscribed}

cCNROID OBJECT IDENTIFIER   ::= {ccitt identified-organization etsi(0) 1065
                                     operations-and-errors(1)}

cCNRRequest                 CCNRRequest                 ::= globalValue {cCNROID 1}
cCNRInterrogate             CCNRInterrogate             ::= globalValue {cCNROID 2}

-- The object identifiers below are defined in EN 300 359-1 and should be imported from there

cCBSOID OBJECT IDENTIFIER   ::= {ccitt identified-organization etsi(0) 359
                                     operations-and-errors(1)}

callInfoRetain              CallInfoRetain              ::= globalValue {cCBSOID 1}
cCBSDeactivate              CCBSDeactivate              ::= globalValue {cCBSOID 3}
cCBSErase                   CCBSErase                   ::= globalValue {cCBSOID 5}
cCBSRemoteUserFree          CCBSRemoteUserFree          ::= globalValue {cCBSOID 6}
cCBSCall                    CCBSCall                    ::= globalValue {cCBSOID 7}
cCBSStatusRequest           CCBSStatusRequest           ::= globalValue {cCBSOID 8}
cCBSBFree                   CCBSBFree                   ::= globalValue {cCBSOID 9}
eraseCallLinkageID          EraseCallLinkageID          ::= globalValue {cCBSOID 10}
cCBSStopAlerting            CCBSStopAlerting            ::= globalValue {cCBSOID 11}
invalidCallLinkageID        InvalidCallLinkageID        ::= globalValue {cCBSOID 20}
invalidCCBSReference        InvalidCCBSReference        ::= globalValue {cCBSOID 21}
longTermDenial              LongTermDenial              ::= globalValue {cCBSOID 22}
shortTermDenial             ShortTermDenial             ::= globalValue {cCBSOID 23}
cCBSIsAlreadyActivated      CCBSIsAlreadyActivated      ::= globalValue {cCBSOID 24}
alreadyAccepted             AlreadyAccepted             ::= globalValue {cCBSOID 25}
outgoingCCBSQueueFull       OutgoingCCBSQueueFull       ::= globalValue {cCBSOID 26}
notReadyForCall             NotReadyForCall             ::= globalValue {cCBSOID 28}

END -- of CCNR-Operations-and-Errors
```

Table 4: Operation and error definitions for the CCNR supplementary service for interworking with private ISDNs

```
CCNR-private-networks-Operations-and-Errors {ccitt identified-organization etsi(0) 1065
                                        private-networks-operations-and-errors(2)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

EXPORTS             CCNR-T-Request;

IMPORTS             OPERATION, ERROR
                    FROM Remote-Operation-Notation
                        {joint-iso-ccitt remote-operations(4) notation (0)}

                    notSubscribed
                    FROM General-Errors
                        {ccitt identified-organization etsi(0) 196 general-errors(2)}

                    Address
                    FROM Addressing-Data-Elements
                        {ccitt identified-organization etsi(0) 196 addressing-data-elements(6)}

                    Q931InformationElement
                    FROM Embedded-Q931-Types
                        {ccitt identified-organization etsi(0) 196 embedded-q931-types(7)}

                    CCBS-T-Call, CCBS-T-Suspend, CCBS-T-Resume, CCBS-T-RemoteUserFree,
                    CCBS-T-Available, LongTermDenial, ShortTermDenial
                    FROM CCBS-private-networks-Operations-and-Errors
                        {ccitt identified-organization etsi(0) 359
                         private-networks-operations-and-errors(2)};

CCNR-T-Request              ::= OPERATION
                                ARGUMENT SEQUENCE {
                                            destinationAddress           Address,
                                            q931InfoElement              Q931InformationElement,
                                            -- contains HLC, LLC and BC information
                                            retentionSupported           [1] IMPLICIT BOOLEAN
                                                                             DEFAULT FALSE,
                                            presentationAllowedIndicator [2] IMPLICIT BOOLEAN
                                                                             OPTIONAL,
                                            -- The use of this parameter is specified in
                                            -- EN 300 195-1 for interaction of CCNR with CLIP
                                            originatingAddress           Address OPTIONAL}
                                            -- The use of this parameter is specified in
                                            -- EN 300 195-1 for interaction of CCNR with CLIP
                                RESULT      retentionSupported BOOLEAN   -- Default False
                                ERRORS     {ShortTermDenial, notSubscribed, LongTermDenial}

cCNR-T-OID OBJECT IDENTIFIER   ::= {ccitt identified-organization etsi(0) 1065
                                        private-networks-operations-and-errors(2)}

cCNR-T-Request              CCNR-T-Request          ::= globalValue {cCNR-T-OID 1}

-- The object identifiers below are defined in EN 300 359-1 and should be imported from there

cCBS-T-OID OBJECT IDENTIFIER   ::= {ccitt identified-organization etsi(0) 359
                                        private-networks-operations-and-errors(2)}

cCBS-T-Call                 CCBS-T-Call             ::= globalValue {cCBS-T-OID 2}
cCBS-T-Suspend              CCBS-T-Suspend          ::= globalValue {cCBS-T-OID 3}
cCBS-T-Resume               CCBS-T-Resume           ::= globalValue {cCBS-T-OID 4}
cCBS-T-RemoteUserFree       CCBS-T-RemoteUserFree   ::= globalValue {cCBS-T-OID 5}
cCBS-T-Available            CCBS-T-Available        ::= globalValue {cCBS-T-OID 6}

longTermDenial              LongTermDenial          ::= globalValue {cCBS-T-OID 20}
shortTermDenial             ShortTermDenial         ::= globalValue {cCBS-T-OID 21}

END -- of CCNR-private-networks-operations-and-errors
```

8 State definitions

8.1 User A states

The following states have been defined for user A:

CCNR Idle:	The CCNR supplementary service is not activated.
CCNR Requested:	The user has sent a CCNR request to network A and is waiting for a response.
CCNR Activated:	The CCNR supplementary service has been activated.
CCNR Free:	The user has received a B free indication.
CCNR Call Init:	The user has accepted the recall.
CCNR Interrogation Requested:	The user has requested interrogation and is waiting for a response.
CCNR DeactivationRequested:	The user has requested deactivation and is waiting for a response.

8.2 User B states

No additional states are defined for user B.

8.3 Network A states

The following states have been defined for network A:

CCNR Idle:	The CCNR supplementary service is not activated.
CCNR Requested:	The network A has sent a CCNR request to network B and is waiting for a response.
CCNR Activated:	The CCNR supplementary service has been activated.
CCNR Free:	The network A has received a B free indication and has informed user A.
CCNR Suspended:	The CCNR supplementary service has been suspended.
CCNR Call Init:	The network A has initiated the CCNR call.
CCNR Check A:	Waiting for a response from user A to the CCNR status request procedure.

8.4 Network B states

The following states have been defined for network B:

CCNR Idle:	There are no outstanding requests.
CCNR Await Processing:	The request is in the queue B, user B is being monitored.
CCNR Await Status:	Idle Waiting for a response from user B to the status request procedure.
CCNR WAIT T-CCBS4:	Waiting for idle guard timer to expire.
CCNR Free:	User B is free, awaiting CCNR call.

9 Signalling procedures at the coincident S and T reference point

9.1 Activation

9.1.1 Normal operation

In order that a user A who has subscribed to the CCNR supplementary service may utilize the service when a destination B, which does not answer a call, is encountered it is necessary for network A to utilize the call information retention procedure.

Network A shall provide the call information retention procedure, according to the procedures in subclause 9.6, when the following set of conditions applies:

- CCNR is subscribed to;
- an alerting indication has been received from user B;
- CCNR is available (as determined by network B);
- the user A CCNR queue limit has not been exceeded;
- CCNR has not been activated for an identical call (network option); and
- there are no supplementary service interactions that preclude CCNR.

However, these conditions shall not prevent network A from providing the call information retention procedure in other circumstances.

Call information retained by network A in support of CCNR shall be the following basic call information from the initial call, if available, in order to enable an identical basic call to be made:

- bearer capability information;
- high layer compatibility information;
- low layer compatibility information;
- calling party address information; and,
- called party address information.

NOTE 1: This information may be derived from user A provided information or may be network A provided, e.g. the calling party number may be user or network A provided. For some basic services the information may be derived from more than one information element, e.g. for the 7 kHz telephony teleservice the bearer capability information may include information from two Bearer capability information elements and details on the priority of this information.

Furthermore, network A shall retain the CCNR available indication, determined by network B, which may be used to decide whether CCNR is permitted.

NOTE 2: When interacting with other supplementary services, retention of further information may be mandatory. Furthermore, the retention of addresses is independent of any supplementary service, although the address information retained may be influenced by other supplementary services. Refer to EN 300 195-1 [13] for details on supplementary service interactions.

In addition to the procedures described in subclause 9.6, on receiving an indication from the network that the call has been accepted, network A shall release the callLinkageID parameter value and make the value available for subsequent use, release all retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A.

If network A knows that a point-to-point configuration exists at user A's access, network A shall send this information according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise, network A shall send this information according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14].

If the call is cleared after the ALERTING message has been sent to user A and the CCNR supplementary service has not been activated, network A shall continue retaining the call information, the callLinkageID parameter and start T-RETENTION. The further procedures for timer T-RETENTION are described in subclause 9.6.

To activate the CCNR supplementary service, user A shall send a CCNRRequest invoke component including the callLinkageID parameter to network A, using the procedures in subclause 10.2.2.1 of EN 300 196-1[14]. The callLinkageID parameter is determined according to the procedures on subclause 9.6. On receiving this invoke component, network A shall start the CCNR procedure.

On accepting the CCNR request by network A, i.e.:

- CCNR is subscribed to;
- user A CCNR queue limit has not been reached;
- a valid callLinkageID parameter has been provided;
- CCNR has not been activated for an identical call (network option); and,
- there are no supplementary service interactions that preclude CCNR,

network A shall request activation of the CCNR supplementary service at network B.

If the CCNR supplementary service was requested by user A after the ALERTING message has been sent to user A and before the call is cleared, network A shall clear the call with cause #31 "normal, unspecified" according to subclause 5.3.4 of EN 300 403-1 [11]. Furthermore, network A shall initiate normal call clearing towards network B.

On receiving confirmation that the CCNR supplementary service has been activated at network B, network A shall select a new value for the cCBSReference parameter, send a CCNRRequest return result component to user A including the cCBSReference parameter and the recallMode parameter, as described in subclause 10.2.2.1 of EN 300 196-1 [14], place the CCNR request in queue A, and start timer T-CCBS2. The status notification procedure does not apply. The recallMode parameter shall be set according to the value of the subscription option "recall mode". The cCBSReference parameter shall have significance on the whole access, i.e. a cCBSReference parameter value shall not be reused for subsequent CCNR or CCBS requests on an access before it is released.

If user A receives a correctly encoded CCNRRequest return result component, then user A shall follow the procedure described in subclause 10.2.2.1 of EN 300 196-1 [14]. If the recallMode parameter indicates "specificRecall", then user A shall retain the cCBSReference parameter. If the recallMode parameter indicates "globalRecall", then on receipt of the CCNRRequest return result component, user A may retain the cCBSReference parameter, e.g. for the purpose of interrogation and deactivation.

9.1.2 Exceptional procedures

If network A cannot accept the CCNR request because user A has not subscribed to the CCNR supplementary service, then network A shall send a CCNRRequest return error component indicating "notSubscribed" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If network A cannot accept the CCNR request because user A has provided an invalid callLinkageID parameter then network A shall send a CCNRRequest return error component indicating "invalidCallLinkageID" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If network A cannot accept the CCNR request because queue A is full, then network A shall send a CCNRRequest return error component indicating "outgoingCCBSQueueFull" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If network A cannot accept the CCNR request because user A has already activated the CCNR supplementary service for the call identified by the callLinkageID parameter, then network A shall send a CCNRRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If the network A option "check for identical calls" is set to "yes", network A shall check if the call for which CCNR is requested and a call in queue A are identical.

If network A cannot accept the CCNR request because user A has already activated the CCNR supplementary service for an identical call placed in queue A, then network A shall send a CCNRRequest return error component indicating "cCBSIsAlreadyActivated" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

To determine whether the call indicated by the callLinkageID parameter and a call in queue A are identical, the following basic call information shall be compared, if available:

- Bearer capability information;
- High layer compatibility information;
- Low layer compatibility information;
- Called party address information; and
- Calling party address information.

If network A cannot accept the CCNR request because there are invalid supplementary service interactions between the CCNR supplementary service and the call identified by the callLinkageID parameter, then network A shall send a CCNRRequest return error component indicating "supplementaryServiceInteractionNotAllowed" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If network A cannot accept the CCNR request identified by the callLinkageID parameter because CCNR is not available to the destination, then network A shall send a CCNRRequest return error component indicating "longTermDenial" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

NOTE: This includes the case that network B did not indicate that CCNR was available when alerting has been initiated at the called address and the case that the request for CCNR was rejected by network B.

If network A cannot accept the CCNR request identified by the callLinkageID parameter because the CCNR supplementary service is not available to the destination at this time, then network A shall send a CCNRRequest return error component indicating "shortTermDenial" to user A, using the procedure in subclause 10.2.2.2 of EN 300 196-1 [14].

If timer T-CCBS2 expires, network A shall deactivate the CCNR supplementary service activation according to the procedures in subclause 9.4.4. The cCBSEraseReason parameter shall indicate "t-CCBS2-timeout".

On expiration of timer T-ACTIVATE and user A has not received any response to the CCNRRequest invoke component, then user A shall consider that this request for the CCNR supplementary service has failed.

On receipt of a CCNRRequest return error component indicating "invalidCallLinkageID", then user A shall remove knowledge of this callLinkageID parameter.

If the return error component indicates any other reason, then user A shall take no action.

If a reject component is received and the invoke identifier is included, user A shall ignore the received component.

Subsequent procedures for network A and user A are as specified in subclause 10.2.2.2 of EN 300 196-1 [14] for terminating the transaction.

9.2 User initiated deactivation procedure

The procedures in subclause 9.2 of EN 300 359-1 [15] shall apply.

9.3 Interrogation

9.3.1 General interrogation

9.3.1.1 Normal operation

To perform an interrogation of all CCNR requests, user A shall send a CCNRInterrogate invoke component without a cCBSReference parameter to network A using the procedure described in subclause 10.2.4.1 of EN 300 196-1 [14]. User A may provide the partyNumberOfA parameter in the CCNRInterrogate invoke component.

On receiving this invoke component, network A shall send a CCNRInterrogate return result component to user A according to the procedure defined in subclause 10.2.4.1 of EN 300 196-1 [14]. The return result component shall contain as arguments the recallMode parameter and a list in chronological order of the CCNR requests for this access, if any. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

For each request, network A shall provide the cCBSReference parameter, and according to the procedures in subclause 9.7, the addressOfB parameter, q931InfoElement parameter, and, if available, the subAddressOfA parameter. If no requests exist the callDetails parameter shall not be included. The network A shall ignore the partyNumberOfA parameter, if provided by the user.

NOTE 1: Other uses of the partyNumberOfA parameter e.g. the interaction with multiple subscriber number supplementary service are specified in EN 300 195-1 [13].

On receipt of this return result component, user A shall follow the procedure described in subclause 10.2.4.1 of EN 300 196-1 [14] and shall discard details of those requests that are not compatible with user A's service compatibility information according to the procedure in subclause 9.7.

NOTE 2: In the case of "globalRecall" any cCBSReference parameter may be retained by a user e.g. for the purpose of deactivation.

9.3.1.2 Exceptional procedures

If network A cannot accept the request because user A has not subscribed to the CCNR supplementary service, then network A shall send a CCNRInterrogate return error component, indicating "notSubscribed" to user A using the procedure described in subclause 10.2.4.2 of EN 300 196-1 [14].

On receipt of this return error component, user A shall remove knowledge of all CCNR requests, if any.

Subsequent procedures for network A and user A are as specified in subclause 10.2.4.2 of EN 300 196-1 [14] for terminating the transaction.

If user A receives a reject component and the invoke identifier is included, then user A shall take no protocol action.

On expiration of timer T-INTERROGATE and user A has not received any response to the CCNRInterrogate invoke component, then the user A shall consider that this attempt to interrogate the CCNR supplementary service has failed.

9.3.2 Specific interrogation

9.3.2.1 Normal operation

To perform an interrogation of a specific active CCNR request, user A shall send a CCNRInterrogate invoke component with the cCBSReference parameter of the request to be interrogated to network A using the procedure described in subclause 10.2.4.1 of EN 300 196-1 [14].

On receiving this invoke component, network A shall send a CCNRInterrogate return result component to user A using the procedure described in subclause 10.2.4.1 of EN 300 196-1 [14]. The return result component shall contain as arguments the recallMode parameter, the cCBSReference parameter and according to the procedures in subclause 9.7, the addressOfB parameter, the q931InfoElement parameter, and, if available, the subaddressOfA parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

On receipt of this return result component, user A shall follow the procedure described in subclause 10.2.4.1 of EN 300 196-1 [14] and shall take no further protocol actions.

9.3.2.2 Exceptional procedures

If network A cannot accept the request because user A has not subscribed to the CCNR supplementary service, then network A shall send a CCNRInterrogate return error component indicating "notSubscribed" to user A using the procedure described in subclause 10.2.4.2 of EN 300 196-1 [14].

On receipt of this return error component, user A shall remove knowledge of all CCNR requests.

If network A cannot accept the request because user A has provided an invalid cCBSReference parameter, then network A shall send a CCNRInterrogate return error component indicating "invalidCCBSReference" to user A using the procedure described in subclause 10.2.4.2 of EN 300 196-1 [14].

On receipt of this return error component, user A shall remove knowledge of the CCNR request identified by the cCBSReference parameter.

Subsequent procedures for network A and user A are as specified in subclause 10.2.4.2 of EN 300 196-1 [14] for terminating the transaction.

If user A receives a reject component and the invoke identifier is included, then user A shall retain knowledge of the CCNR request identified by the cCBSReference parameter.

On expiration of timer T-INTERROGATE and user A has not received any response to the CCNRInterrogate invoke component, then user A shall consider that this attempt to interrogate the CCNR supplementary service has failed.

9.4 Invocation and operation

9.4.1 Recall indication

9.4.1.1 Normal operation

If network A is informed that user B is not busy after having initiated an activity, network A shall determine whether user A is neither busy nor CCNR busy by using the procedures in subclause 9.4.6.

If user A is neither busy nor CCNR busy, then network A shall start timer T-CCBS3 and indicate that it is prepared for establishment of the requested call, by sending a CCBSRemoteUserFree invoke component to user A. If network A knows that a point-to-point configuration exists at user A's access, network A shall send this invoke component according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise network A shall send this invoke component according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14]. The invoke component shall contain as arguments the recallMode parameter, the cCBSReference parameter, and, according to the procedures in subclause 9.7, the addressOfB parameter and q931InfoElement parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode".

If user A is busy or CCNR busy, then network A shall proceed according to subclause 9.4.5.

On receipt of the CCBSRemoteUserFree invoke component, user A shall ignore the invoke component, unless the service provided by user A is compatible with the service indicated in the CCBSRemoteUserFree invoke component as determined by the procedure in subclause 9.7.

Users accepting this invoke component shall retain the cCBSReference parameter value and may proceed to establish a call using the procedures in subclause 9.4.2.

9.4.1.2 Exceptional procedures

If on receipt of the CCBSRemoteUserFree invoke component user A does not want to accept the CCNR recall, then user A shall either:

- ignore the CCBSRemoteUserFree invoke component; or,
- shall initiate the deactivation procedure as described in subclause 9.2.

If timer T-CCBS2 or T-CCBS3 expire, the CCNR supplementary service shall be deactivated according to the procedures in subclause 9.4.4. The cCBSEraseReason parameter shall indicate "t-CCBS2-timeout" respectively "t-CCBS3-timeout".

If a reject component is received and the invoke identifier is included, then network A shall take no action.

9.4.2 CCNR call request

The procedures in subclause 9.4.2 of EN 300 359-1 [15] shall apply.

9.4.3 CCNR call establishment

The procedures in subclause 9.4.3 of EN 300 359-1 [15] shall apply.

9.4.4 Network initiated deactivation procedures

The procedures in subclause 9.4.4 of EN 300 359-1 [15] shall apply.

9.4.5 B free but A busy procedure

9.4.5.1 Normal operation

If network A is informed that user B is not busy after having initiated an activity, and user A is either busy or CCNR busy (as determined using the procedures in subclause 9.4.6), then network A shall inform user A by sending a CCBSBFree invoke component to user A, suspend CCNR processing and wait for user A becoming not CCNR busy.

Network A shall send the CCBSBFree invoke component to user A containing as arguments the recallMode parameter, the cCBSReference parameter, and, according to the procedure in subclause 9.7, the addressOfB parameter and q931InfoElement parameter. If network A knows that a point-to-point configuration exists at user A's access, network A shall send this invoke component according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise network A shall send this invoke component according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14].

On receipt of the CCBSBFree invoke component, user A shall ignore the invoke component unless it is compatible with the request as determined by the procedure in subclause 9.7. Users accepting this invoke component shall treat it as an indication that user B is now free.

In case of CCNR request(s) being suspended, network A shall apply the user A monitoring procedure in subclause 9.4.6 for all suspended requests in the following situations:

- on user A becoming not CCNR busy; or,
- if a busy or reserved B-channel becomes free while user A is not CCNR busy.

Each request for which user A indicates to be free shall be resumed. For each resumed CCNR request, network A shall continue according to the procedures in subclause 9.4.1.1. CCNR requests for which user A indicates to be busy shall remain suspended.

9.4.5.2 Exceptional procedures

If a reject component is received and the invoke identifier is included, then network A shall take no action.

9.4.6 User A monitoring procedure

9.4.6.1 Normal operation

Whenever network A needs to know the status of user A, network A shall decide if user A is CCNR busy.

In the case that user A is not CCNR busy, in order to determine if user A is not busy, network A shall start timer T-CCBS1 and send a CCBSStatusRequest invoke component to user A. For this purpose, the status request procedure as defined in subclause 10.3 of EN 300 196-1 [14] is used, with the exception that the CCBSStatusRequest components are used instead of the components of the StatusRequest operation. The invoke component shall contain as arguments the cCBSReference parameter, the recallMode parameter, and, according to the procedure in subclause 9.7, the q931InfoElement parameter. The recallMode parameter shall be set according to the value of the subscription option "recall mode". If network A knows that a point-to-point configuration exists at user A's access, network A shall send this invoke component according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise network A shall send this invoke component according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14].

On receiving this invoke component, user A shall ignore the invoke component unless the service it provides is compatible with the request as determined by the procedure in subclause 9.7.

Users accepting this invoke component shall send a CCBSStatusRequest return result component to network A according to the procedures in subclause 8.3.2.2 of EN 300 196-1 [14]. The return result component shall indicate the user A status for a call compatible with the request as determined by the q931InfoElement parameter according to the procedure in subclause 9.7.

On the receipt of the first CCBSStatusRequest return result component indicating "free" and provided user A is not CCNR busy, network A shall stop timer T-CCBS1 and determine user A to be not busy.

On receipt of a CCBSStatusRequest return result component indicating "busy" and network A has knowledge that a point-to-point configuration exists, then network A shall stop timer T-CCBS1 and determine user A to be busy.

If timer T-CCBS1 expires and only CCBSStatusRequest return result component(s) indicating "busy" are received, network A shall determine that user A is busy.

9.4.6.2 Exceptional procedures

If timer T-CCBS1 expires and no CCBSStatusRequest return result component has been received by network A, network A shall deactivate the CCNR supplementary service according to subclause 9.4.4. The cCBSEraseReason parameter shall indicate "normal-unspecified".

If a reject component is received and the invoke identifier is included, user A or network A shall ignore this component.

9.5 Procedures at network B

9.5.1 Determination that CCNR is available

9.5.1.1 Normal operation

CCNR is available at network B, when the following set of conditions apply:

- an ALERTING message has been received from user B; and,
- the maximum length of queue B is greater than zero.

9.5.1.2 Exceptional procedures

Not applicable.

9.5.2 Acceptance of a CCNR request

The procedures in subclause 9.5.2 of EN 300 359-1 [15] shall apply.

9.5.3 Queue B processing

9.5.3.1 Normal operation

The CCNR requests in queue B shall be processed in chronological order, although the actual mechanism for processing queue B is outside the scope of the present document. During the processing of queue B, the CCNR requests which are currently suspended shall be ignored.

Queue B processing shall start if an activity has been recognized at destination B and after that a B-channel becomes free. This means that network B shall retain knowledge that an activity has occurred and remove this knowledge, when a B-channel becomes free.

If on resumption of a CCNR request queue processing is not active, then for the resumed CCNR request (and only this) the determination of user B free shall take place according to the procedures in subclause 9.5.4.

On selection of a CCNR request the determination of user B free shall take place according to the procedure in subclause 9.5.4.

If, for any reason, no CCNR call results from the processing of a CCNR request, then the next CCNR request against user B shall be selected for processing.

If the whole queue B has been processed and no CCNR call results, processing is complete and shall only be restarted, if the conditions for starting (as specified above) are fulfilled again or became fulfilled again while the previous processing of queue B was ongoing.

9.5.3.2 Exceptional procedures

Not applicable.

9.5.4 Determination of user B free

The procedures in subclause 9.5.4 of EN 300 359-1 [15] shall apply.

9.5.5 CCNR call

The procedures in subclause 9.5.5 of EN 300 359-1 [15] shall apply.

9.6 Call information retention

The call information retention procedure is used for a specific call if a supplementary service which needs the call information may be in operation for that call.

NOTE: The call information retention procedure shall be considered as generic. This implies that the retained information may be available for a number of supplementary services applicable to the specific call.

9.6.1 Normal operation

To provide the call information retention procedure, the network shall:

- select a new value for the callLinkageID parameter; and,
- retain the call information and the callLinkageID parameter; and,
- send a CallInfoRetain invoke component containing the callLinkageID parameter to user A in an ALERTING message according to the procedures in subclause 8.3.1.1 of EN 300 196-1 [14].

NOTE: The conditions for the provision of the call information retention procedure is described in the specific supplementary service.

A network may restrict the number of calls that can simultaneously be subject to the generic call information retention procedure.

The callLinkageID parameter is an identifier used to make reference to the retained call information. The callLinkageID parameter has significance on the whole access.

NOTE: Timer T-RETENTION is started according to subclause 9.1.1, when the call is cleared.

On receipt of the CallInfoRetain invoke component, the user may retain the callLinkageID parameter and use it to control a supplementary service(s).

On operation of a supplementary service that requires the call information, the network shall make the call information available for the supplementary service. The network may then release the retained call information if it has knowledge that no other supplementary service will need the information. Alternatively, the network shall retain the call information for other supplementary services until timer T-RETENTION expires.

If the network releases the call information on operation of a supplementary service, the network shall stop timer T-RETENTION, release the callLinkageID parameter and make the value available for subsequent use, release unwanted retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A. If the network knows that a point-to-point configuration exists at user A's access, the network shall send this information according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise the network shall send this information according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14].

If timer T-RETENTION expires, the network shall release the callLinkageID parameter value and make the value available for subsequent use, release all retained call information, and send an EraseCallLinkageID invoke component containing the callLinkageID parameter to user A. If network A knows that a point-to-point configuration exists at user A's access, network A shall send this information according to the procedure in subclause 8.3.2.2 of EN 300 196-1 [14]. Otherwise, network A shall send this information according to the procedure in subclause 8.3.2.4 of EN 300 196-1 [14].

On receipt of an EraseCallLinkageID invoke component, the user shall remove knowledge, if any, of the callLinkageID parameter value.

9.6.2 Exceptional procedures

If the network receives a reject component and the invoke identifier is included, then the network may wait for the expiry of timer T-RETENTION, else may stop timer T-RETENTION, release the callLinkageID parameter value and make the value available for subsequent use, and release all retained call information.

9.7 Basic call information and compatibility checking at user A

The procedures in subclause 9.7 of EN 300 359-1 [15] shall apply.

10 Procedures for interworking with private ISDNs

The following subclauses cover the procedures associated with the original call attempt, a signalling connection to determine when the CCNR call can be established, and the establishment of the CCNR call. The protocols associated with these three procedures need not exist at the same interface.

10.1 Procedures for the originating T reference point

10.1.1 CCNR available indication

10.1.1.1 Normal operation

If on the attempt to establish a call according to the procedures in subclause 5.1 of EN 300 403-1 [11] the public network encounters or is notified of a destination, which is in the alerting state, and CCNR is available to the destination and the private network has subscribed to the CCNR supplementary service, then the public network shall send a CCBS-T-Available invoke component to the private network in an ALERTING message according to the procedures in subclause 8.3.1.1 of EN 300 196-1 [14].

On receipt of the CCBS-T-Available invoke component, the private network may invoke CCNR according to the procedures in subclause 10.1.2.

10.1.1.2 Exceptional procedures

Not applicable.

10.1.2 CCNR supplementary service request

10.1.2.1 Normal operation

To setup the signalling connection with the public network and to request the activation of CCNR, the private network shall send a CCNR-T-Request invoke component to the public network according to the procedures defined in subclause 8.3.2.1.1 of EN 300 196-1 [14]. The CCNR-T-Request invoke component shall contain as parameters the Bearer capability information element, destinationAddress parameter, retentionSupported parameter, and if available the High layer compatibility information element and Low layer compatibility information element. The retentionSupported parameter shall be set to "TRUE" if the private network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the private network does not support the "CCBS request retention" option. In addition the public network shall start the timer T-CCBS6.

NOTE 1: The functionality of timer T-CCBS6 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network by Signalling System No.7.

NOTE 2: The originationAddress and presentationAllowedIndicator parameters may be included and are used to support the interaction between CCNR and Calling Line Identification Presentation and Calling Line Identification Restriction supplementary services. These interactions are specified in EN 300 195-1 [13].

The call reference established as part of the procedures in subclause 8.3.2.1.1 in EN 300 196-1 [14] shall be used in all subsequent messages using the signalling connection to identify this instance of the CCNR supplementary service.

On receipt of the CCNR-T-Request invoke component the public network shall start monitoring the destination for being not busy after having initiated an activity and send a CCNR-T-Request return result component to the private network according to the procedures defined in subclause 8.3.2.1.2 of EN 300 196-1 [14]. The CCNR-T-Request return result component shall contain the retentionSupported parameter. The retentionSupported parameter in the return result component shall be set to "TRUE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network does not support the "CCBS request retention" option. If the retentionSupported parameter value in the invoke component was set to "FALSE", then the retentionSupported parameter in the return result component is not significant.

On receipt of the CCNR-T-Request return result component the private network shall await an indication that the destination is not busy after having initiated an activity according to the procedures in subclause 10.1.3.If both the private network and the public network support the "CCBS request retention" option then the "CCBS request retention" option shall be used in the subsequent procedures. If either or both the private network and the public network do not support the "CCBS request retention" option then the "CCBS request retention" option shall not be used in the subsequent procedures.

10.1.2.2 Exceptional procedures

If the public network receives a request for establishment of the signalling connection indicating a CCNR-related invoke component different from CCNR-T-Request, the public network shall clear the signalling connection according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] with cause #29 "facility rejected".

If the public network cannot accept the CCNR request because the CCNR supplementary service is not subscribed to, then the public network shall clear the signalling connection to the private network according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "notSubscribed".

If the public network cannot accept the CCNR request because CCNR is not available to the destination (e.g. interworking with a non-CCNR network), then the public network shall clear the signalling connection to the private network according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "longTermDenial".

If the public network cannot accept the CCNR request because CCNR cannot be provided to the destination at this time (e.g. due to queue B congestion, or supplementary service interaction), then the public network shall clear the signalling connection to the private network according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "shortTermDenial".

If the private network receives a reject component on the signalling connection from the public network then the private network shall clear the signalling connection according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14].

When clearing of the signalling connection is complete, the public network shall stop timer T-CCBS6.

10.1.3 User B free indication

The procedures in subclause 10.1.3 of EN 300 359-1 [15] shall apply.

10.1.4 Suspend request

The procedures in subclause 10.1.4 of EN 300 359-1 [15] shall apply.

10.1.5 Resume request

The procedures in subclause 10.1.5 of EN 300 359-1 [15] shall apply.

10.1.6 CCNR call establishment

The procedures in subclause 10.1.6 of EN 300 359-1 [15] shall apply.

10.1.7 Deactivation

The procedures in subclause 10.1.7 of EN 300 359-1 [15] shall apply.

10.2 Procedures for the destination T reference point

10.2.1 CCNR available indication

10.2.1.1 Normal operation

If on the attempt to establish a call according to the procedures in subclause 5.2 of EN 300 403-1 [11] the private network encounters a destination, which does not answer the call, and CCNR is available to the destination, then the private network shall send a CCBS-T-Available invoke component to the public network in an ALERTING message according to the procedures in subclause 8.3.1.1 of EN 300 196-1 [14].

If the CCBS-T-Available invoke component is received, the CCNR possible condition exists.

10.2.1.2 Exceptional procedures

Not applicable.

10.2.2 CCNR supplementary service request

10.2.2.1 Normal operation

To setup the signalling connection with the private network and to request the activation of CCNR, the public network shall send a CCNR-T-Request invoke component to the private network according to the procedures defined in subclause 8.3.2.1.1 of EN 300 196-1 [14]. The CCNR-T-Request invoke component shall contain as parameters the Bearer capability information element, destinationAddress parameter, retentionSupported parameter, and, if available, the High layer compatibility information element and Low layer compatibility information element. The retentionSupported parameter shall be set to "TRUE" if the public network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the public network does not support the "CCBS request retention" option. In addition the public network shall start timer T-CCBS5.

NOTE: The functionality of timer T-CCBS5 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network by Signalling System No.7.

The call reference established as part of the procedures in subclause 8.3.2.1.1 of EN 300 196-1 [14] shall be used in all subsequent messages using the signalling connection to identify this instance of the CCNR supplementary service.

On receipt of the CCNR-T-Request invoke component the private network shall start monitoring the destination for being not busy after having initiated an activity and send a CCNR-T-Request return result component to the public network according to the procedures defined in subclause 8.3.2.1.2 of EN 300 196-1 [14]. The CCNR-T-Request return result component shall contain the retentionSupported parameter. The retentionSupported parameter in the return result component shall be set to "TRUE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network supports the "CCBS request retention" option. The retentionSupported parameter shall be set to "FALSE" if the retentionSupported parameter value in the invoke component was set to "TRUE" and the network does not support the "CCBS request retention" option. If the retentionSupported parameter value in the invoke component was set to "FALSE" then the retentionSupported parameter in the return result component is not significant. On receipt of the CCNR-T-Request return result component, the public network shall await an indication that the destination is not busy after having initiated an activity according to the procedures in subclause 10.2.3.

If both the public network and the private network support the "CCBS request retention" option, then the "CCBS request retention" option shall be used in the subsequent procedures. If either or both the public network and the private network do not support the "CCBS request retention" option, then the "CCBS request retention" option shall not be used in the subsequent procedures.

10.2.2.2 Exceptional procedures

If the private network has not registered for the CCNR supplementary service, the public network shall reject the CCNR request towards network A indicating "longTermDenial".

If the private network receives a request for establishment of the signalling connection indicating a CCNR-related invoke component different from CCNR-T-Request, the private network shall clear the signalling connection according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] with cause #29 "facility rejected".

If the private network cannot accept the CCNR request because CCNR is not available to the destination (e.g. interworking with a non-CCNR network), then the private network shall clear the signalling connection to the public network according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "longTermDenial".

If the private network cannot accept the CCNR request because CCNR cannot be provided to the destination at this time (e.g. due to queue B congestion, or supplementary service interaction), then the private network shall clear the signalling connection to the public network according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14] and shall include in the RELEASE message a CCNR-T-Request return error component indicating "shortTermDenial".

If the public network receives a CCNR-T-Request return error component indicating "notSubscribed" it shall be treated as "longTermDenial".

If the public network receives a reject component on the signalling connection from the private network then the public network shall clear the signalling connection according to the procedures defined in subclause 8.3.2.1.3 of EN 300 196-1 [14]. When clearing of the signalling connection is complete, the public network shall stop timer T-CCBS5.

10.2.3 User B free indication

10.2.3A Normal operation

The procedures in subclause 10.2.3 of EN 300 359-1 [15] shall apply.

10.2.4 Suspend request

The procedures in subclause 10.2.4 of EN 300 359-1 [15] shall apply.

10.2.5 Resume request

The procedures in subclause 10.2.5 of ETS 300 359-1 [15] shall apply.

10.2.6 CCNR call establishment

The procedures in subclause 10.2.6 of EN 300 359-1 [15] shall apply.

10.2.7 Deactivation

The procedures in subclause 10.2.7 of EN 300 359-1 [15] shall apply.

11 Interactions with other networks

Interaction with other networks (e.g. a PSTN) is only possible if the network is capable to perform the functions as specified for the ISDN network B (see subclause 6.3 and 9.5) and the gateway signalling is compatible with regard to the CCNR supplementary service.

12 Interactions with other supplementary services

The interaction with other supplementary services shall be as specified in EN 300 195-1 [13].

13 Parameter values (timers)

Retention timer T-RETENTION:

When network A has provided the call information retention option procedure, then this timer is started by the network after call clearing during the alerting phase. User A shall send the CCNRRequest invoke component to the network before expiry of this timer. Network A stores relevant information only for the duration of this timer.

The duration of this timer shall have a minimum of 15 seconds.

Status check timer T-CCBS1:

The maximum time the network will wait for user A response for checking for compatible terminals. The value of this timer is 4 seconds.

Status check timer T-STATUS:

The maximum time the network will wait for user B response for checking for compatible terminals. The value of this timer is 4 seconds.

NOTE: Timer T-STATUS is defined in EN 300 196-1 [14], subclause 10.3.

CCNR service duration timer T-CCBS2:

The maximum time the service will be active within the network. The value is a network option, and depends on the supplementary service being used. For the CCNR supplementary service the value is between 60 and 180 minutes.

Recall timer T-CCBS3:

The maximum time the network will wait for user A response to a CCNR recall. The value is between 10 and 20 seconds.

Destination B idle guard timer T-CCBS4:

The time the network will wait after destination B has become not busy after having initiated an activity before indicating a "CCNR recall" or " indication of B idle" to user A. The value of this timer is between 0 - 15 seconds.

Service lifetime supervision timer T-CCBS5:

This timer supervises the lifetime of the signalling connection at the destination public network. The value depends on the supplementary service being used. For the CCNR supplementary service the value is 195 minutes.

Service lifetime supervision timer T-CCBS6:

This timer supervises the lifetime of the signalling connection at the originating public network. The value depends on the supplementary service being used. For the CCNR supplementary service the value is 195 minutes.

Activation timer T-ACTIVATE:

This timer is started by user A, after sending a CCNRRequest invoke component to network A. The value of this timer is 10 seconds.

Deactivation timer T-DEACTIVATE:

This timer is started by user A, after sending a CCBSDeactivate invoke component to network A. The value of this timer is 4 seconds.

Interrogation timer T-INTERROGATE:

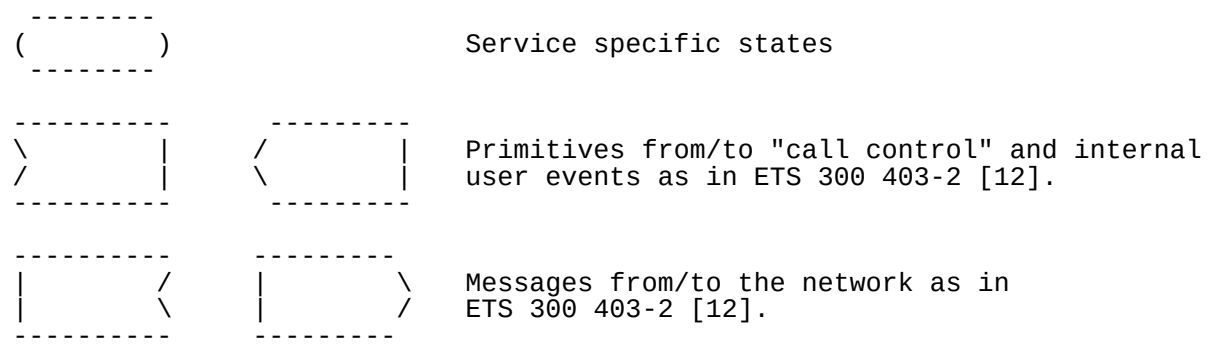
This timer is started by user A, after sending a CCNRInterrogate invoke component to network A. The value of this timer is 4 seconds.

14 Dynamic description (SDL diagrams)

The dynamic description specified in figures 1 to 8 are according to ITU-T Recommendation Z.100 [10].

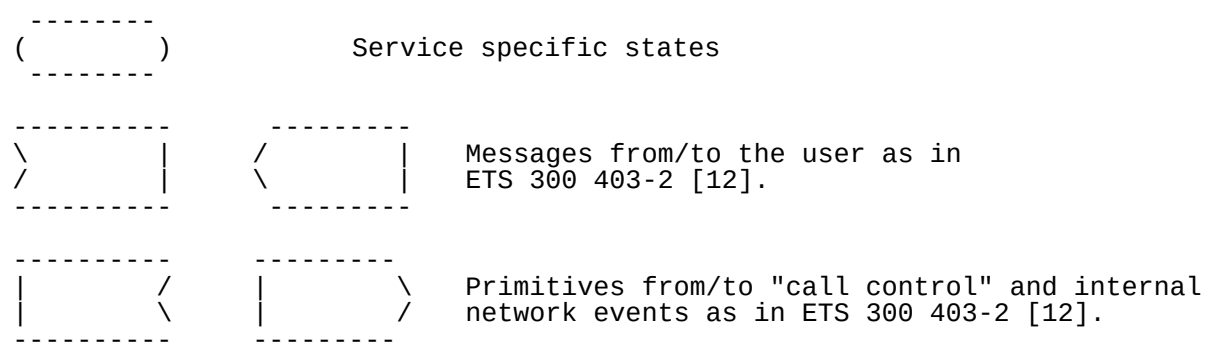
CCNR user side process SDL diagrams

Symbols:



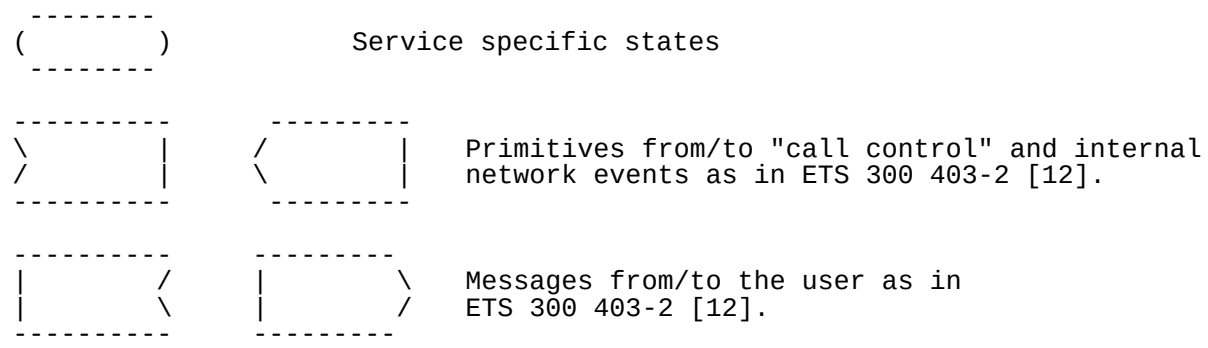
CCNR network A side process SDL diagrams

Symbols:



CCNR destination network side process SDL diagrams

Symbols:



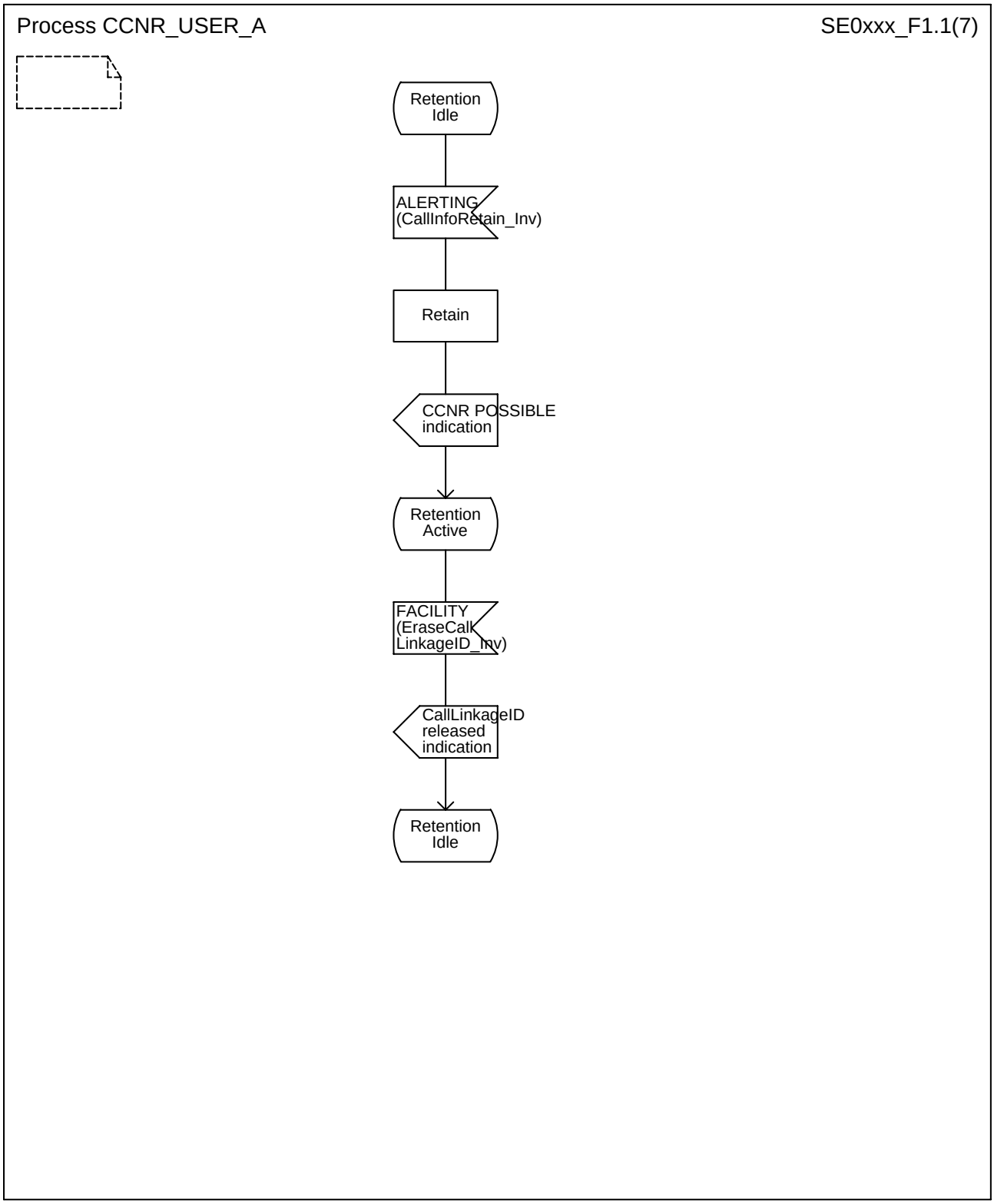

Process CCNR_USER_A
SE0xxx_F1.1(7)
Retention Idle
ALERTING (CallInfoRetain_Inv)
Retain
CCNR POSSIBLE indication
Retention Active
FACILITY (EraseCall LinkageID_Inv)
CallLinkageID released indication
Retention Idle

Figure 1.1

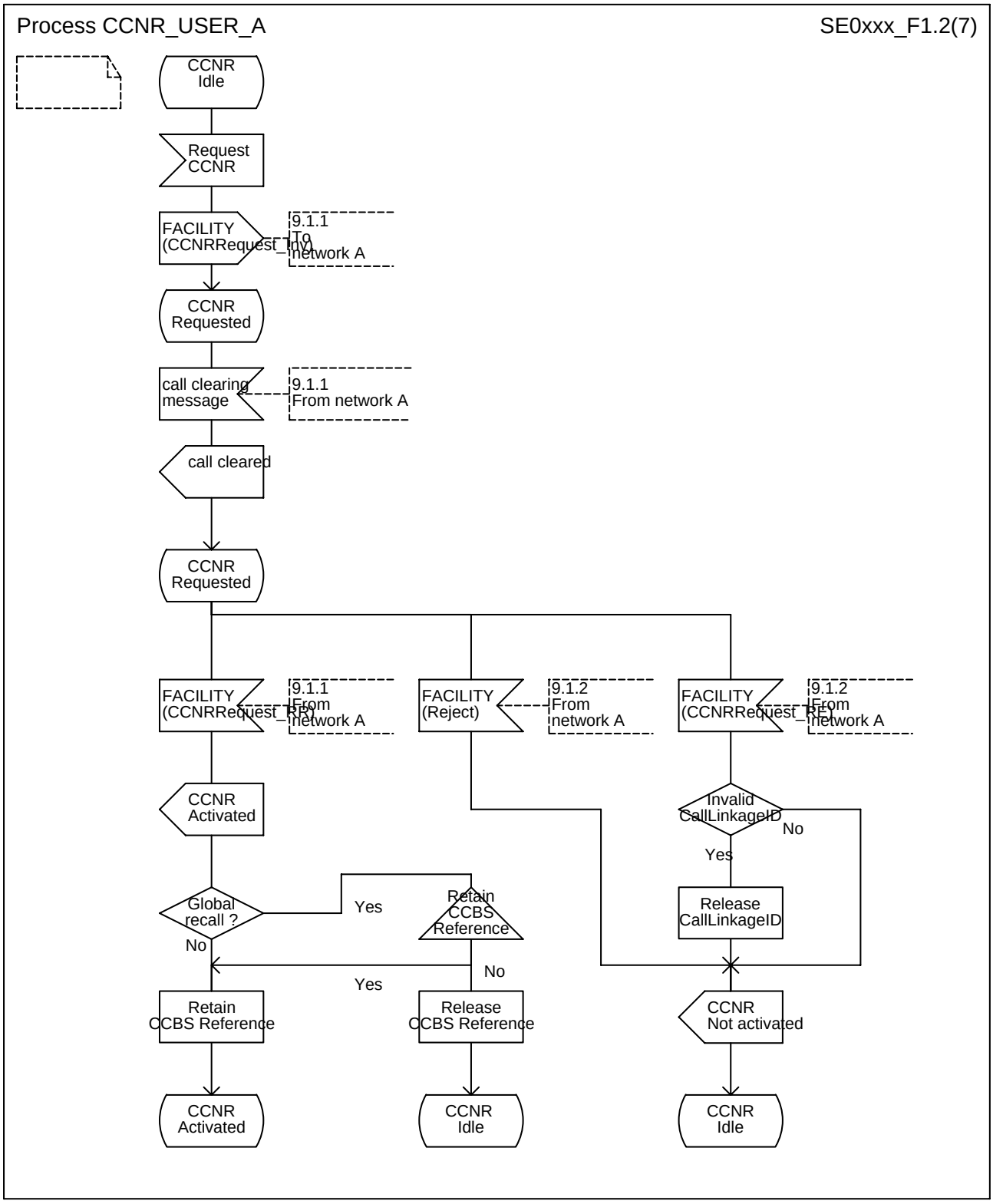

Process CCNR_USER_A
SE0xxx_F1.2(7)
CCNR Idle
Request CCNR
FACILITY (CCNRRequest_Inv)
9.1.1 To network A
CCNR Requested
call clearing message
9.1.1 From network A
call cleared
CCNR Requested
FACILITY (CCNRRequest_RR)
9.1.1 From network A
FACILITY (Reject)
9.1.2 From network A
FACILITY (CCNRRequest_RE)
9.1.2 From network A
CCNR Activated
Invalid CallLinkageID
No
Yes
Global recall ?
Yes
Retain CCBS Reference
Release CallLinkageID
No
No
Yes
Retain CCBS Reference
Release CCBS Reference
CCNR Not activated
CCNR Activated
CCNR Idle
CCNR Idle

Figure 1.2

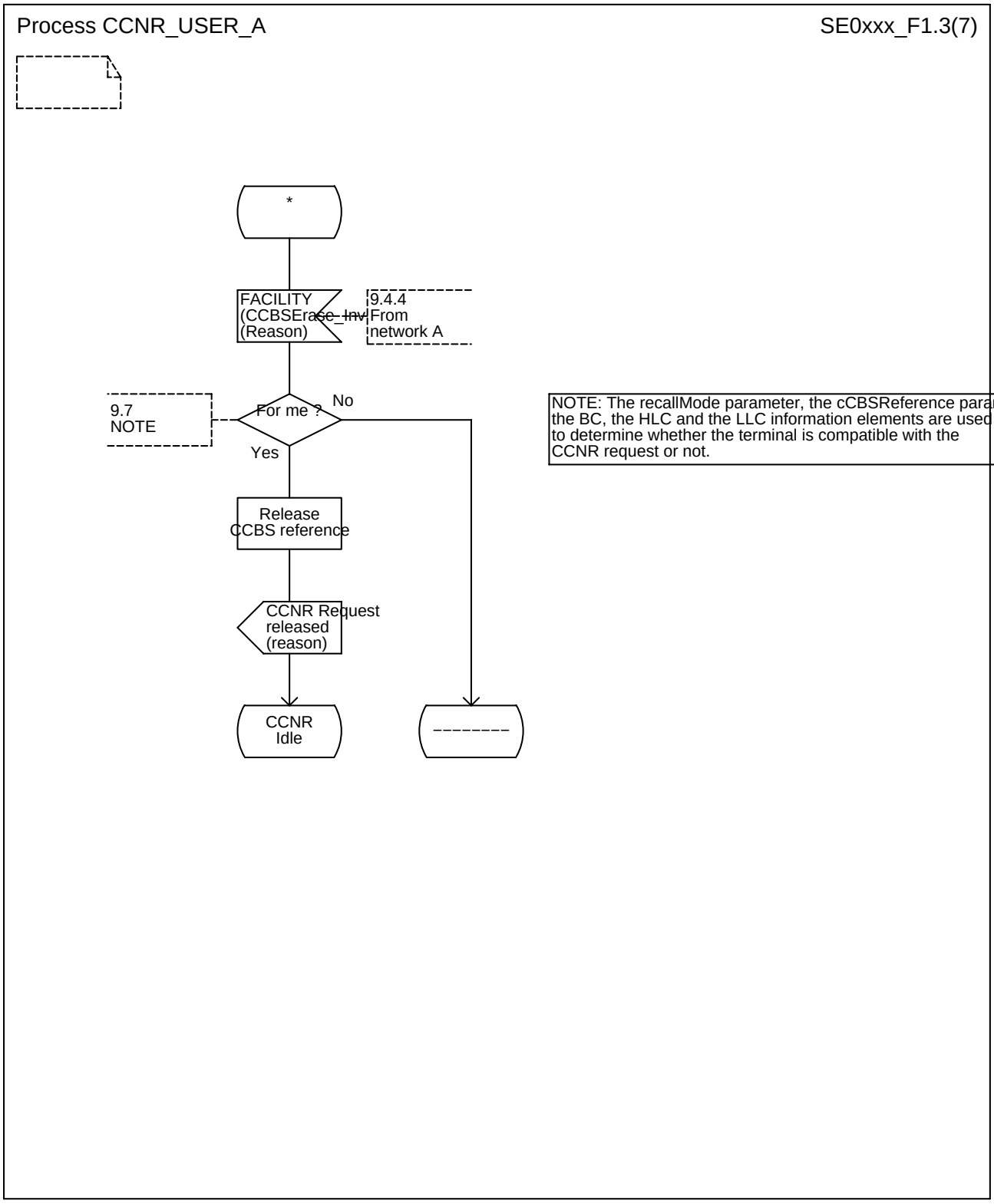

Process CCNR_USER_A
SE0xxx_F1.3(7)
*
FACILITY
(CCBSErase_Inv
(Reason)
9.4.4
From
network A
9.7
NOTE
For me ?
No
Yes
Release
CCBS reference
CCNR Request
released
(reason)
CCNR
Idle
NOTE: The recallMode parameter, the cCBSReference parameter, the BC, the HLC and the LLC information elements are used in order to determine whether the terminal is compatible with the CCNR request or not.

Figure 1.3

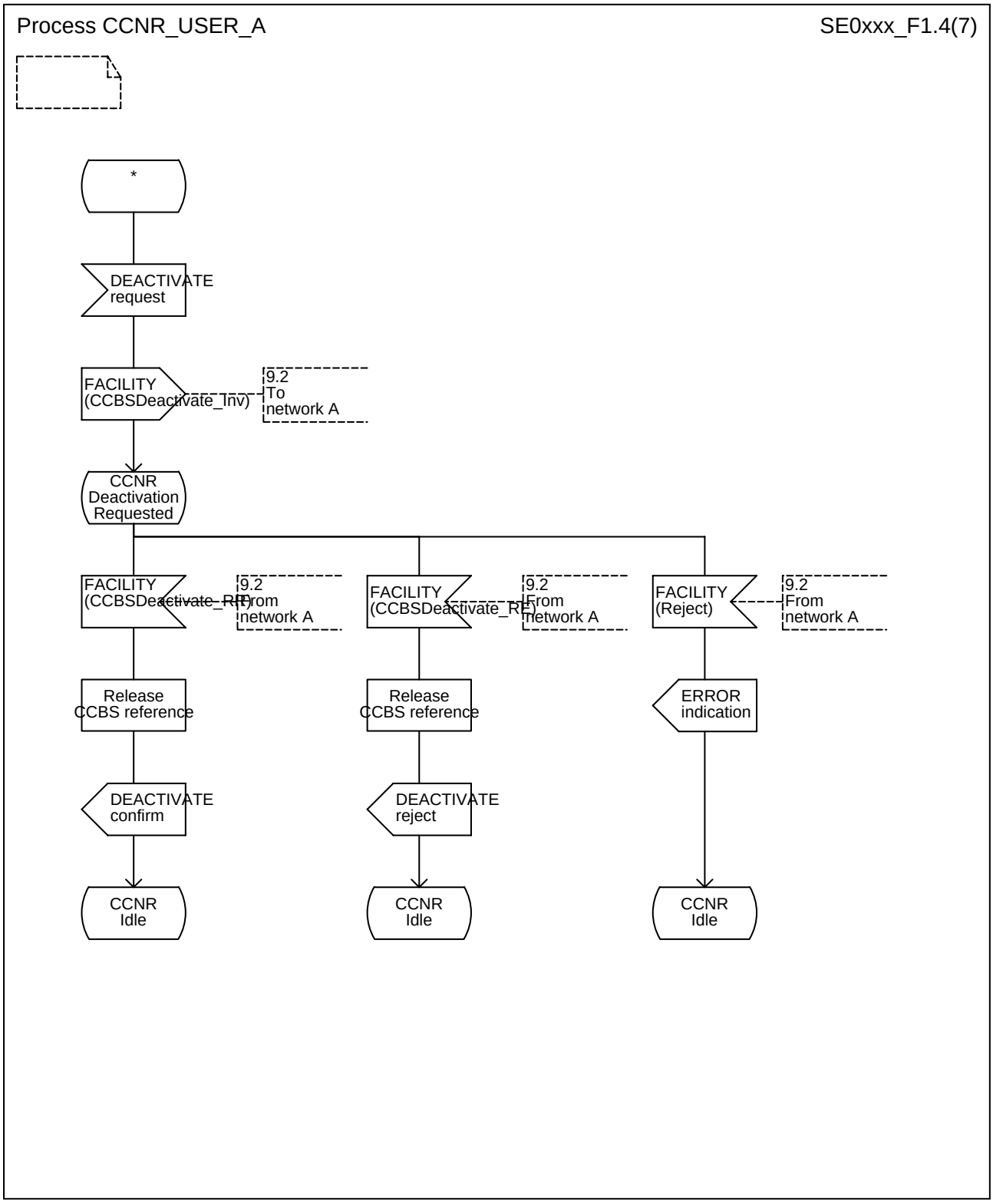

Process CCNR_USER_A
SE0xxx_F1.4(7)
*
DEACTIVATE request
FACILITY (CCBSDeactivate_Inv)
9.2 To network A
CCNR Deactivation Requested
FACILITY (CCBSDeactivate_RR)
9.2 From network A
FACILITY (CCBSDeactivate_RE)
9.2 From network A
FACILITY (Reject)
9.2 From network A
Release CCBS reference
Release CCBS reference
ERROR indication
DEACTIVATE confirm
DEACTIVATE reject
CCNR Idle
CCNR Idle
CCNR Idle

Figure 1.4

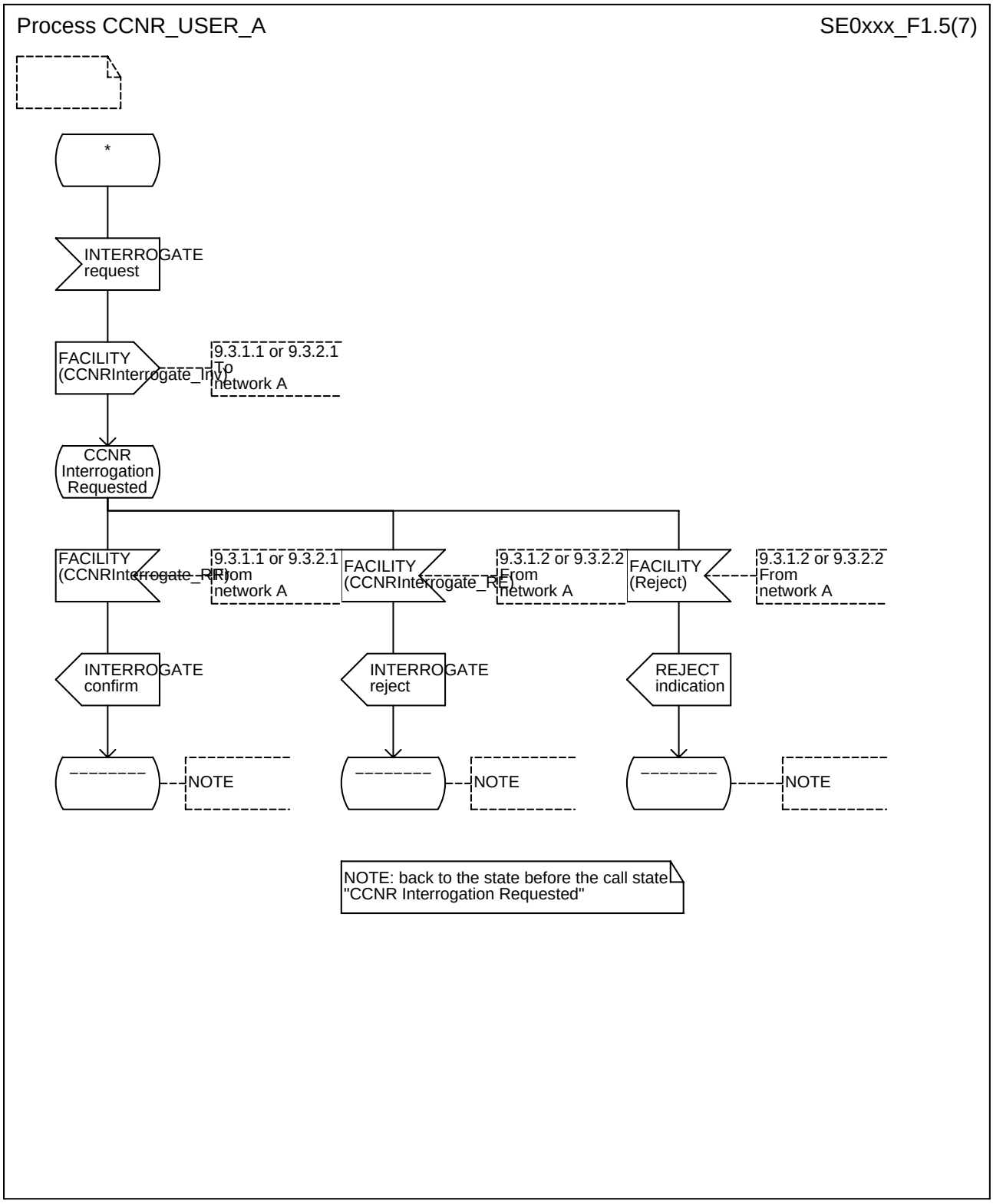

Process CCNR_USER_A
SE0xxx_F1.5(7)
*
INTERROGATE request
FACILITY (CCNRInterrogate_Inv)
9.3.1.1 or 9.3.2.1 To network A
CCNR Interrogation Requested
FACILITY (CCNRInterrogate_RR)
9.3.1.1 or 9.3.2.1 From network A
FACILITY (CCNRInterrogate_RE)
9.3.1.2 or 9.3.2.2 From network A
FACILITY (Reject)
9.3.1.2 or 9.3.2.2 From network A
INTERROGATE confirm
INTERROGATE reject
REJECT indication
NOTE
NOTE
NOTE
NOTE: back to the state before the call state "CCNR Interrogation Requested"

Figure 1.5

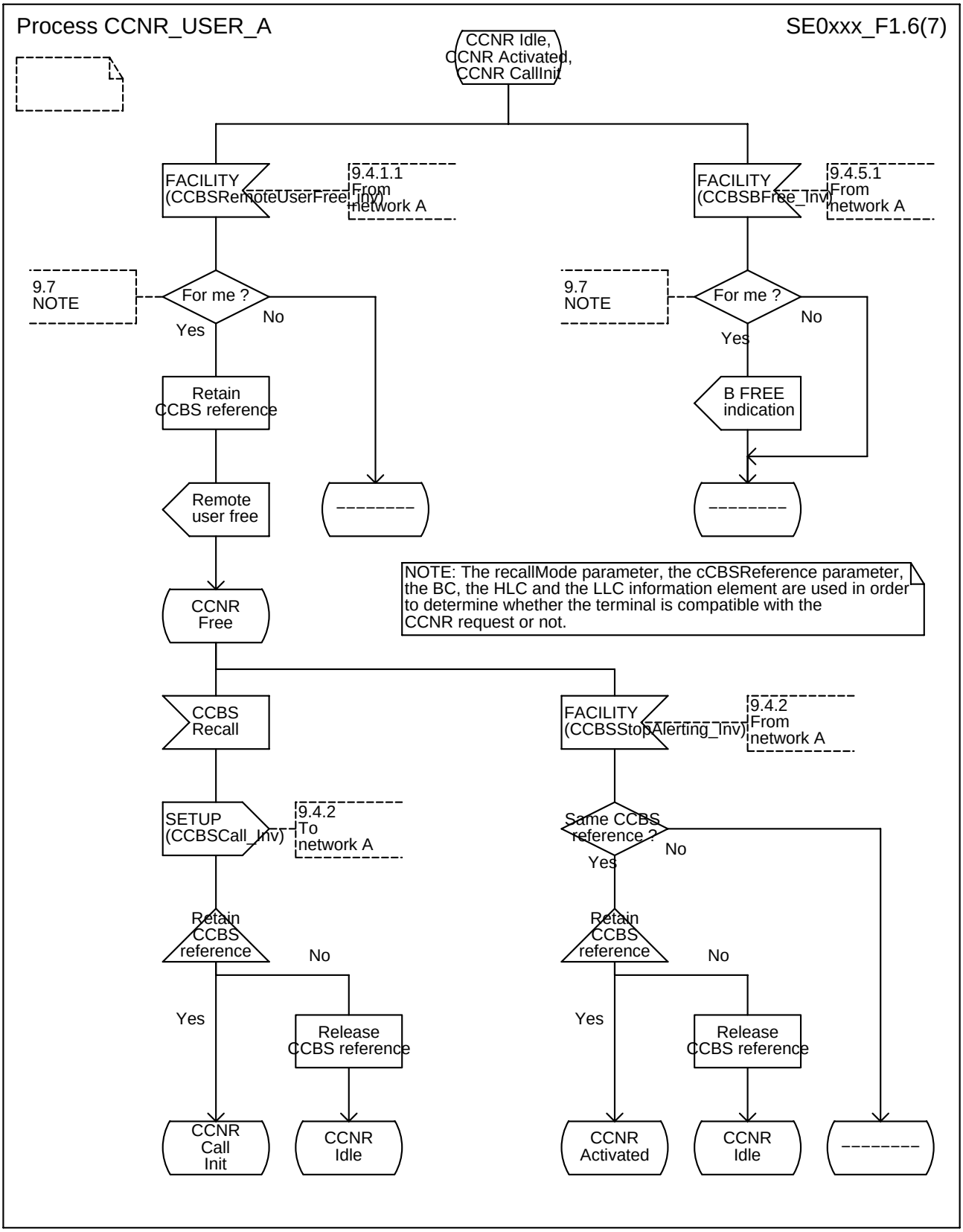

Process CCNR_USER_A
SE0xxx_F1.6(7)
CCNR Idle,
CCNR Activated,
CCNR CallInit
FACILITY
(CCBSRemoteUserFree_Inv)
9.4.1.1
From
network A
FACILITY
(CCBSBFree_Inv)
9.4.5.1
From
network A
9.7
NOTE
For me ?
No
Yes
9.7
NOTE
For me ?
No
Yes
Retain
CCBS reference
B FREE
indication
Remote
user free
NOTE: The recallMode parameter, the cCBSReference parameter, the BC, the HLC and the LLC information element are used in order to determine whether the terminal is compatible with the CCNR request or not.
CCNR
Free
CCBS
Recall
FACILITY
(CCBSStopAlerting_Inv)
9.4.2
From
network A
SETUP
(CCBSCall_Inv)
9.4.2
To
network A
Same CCBS
reference ?
No
Yes
Retain
CCBS
reference
No
Yes
Retain
CCBS
reference
No
Yes
Release
CCBS reference
Release
CCBS reference
CCNR
Call
Init
CCNR
Idle
CCNR
Activated
CCNR
Idle

Figure 1.6

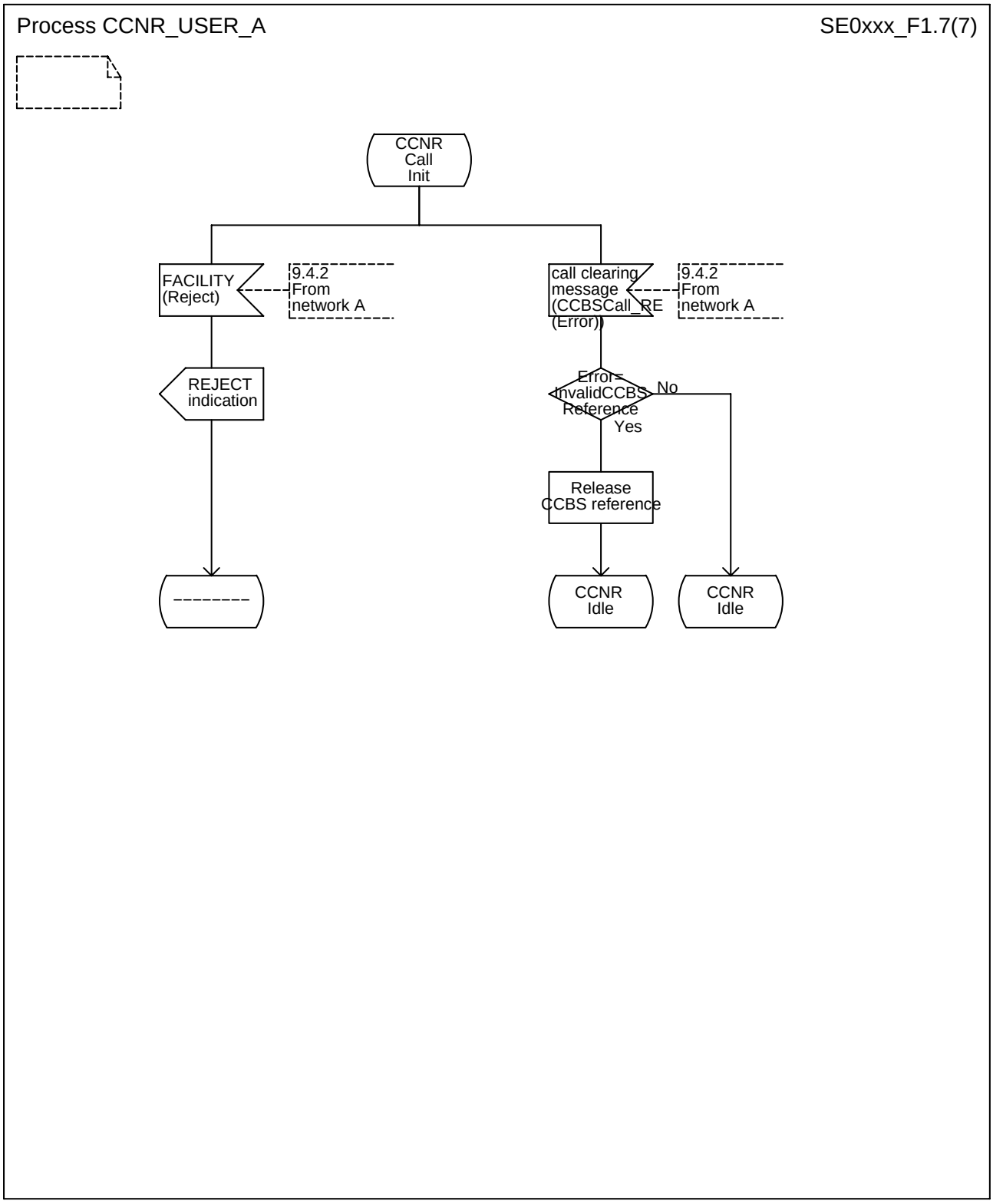

Process CCNR_USER_A
SE0xxx_F1.7(7)
CCNR Call Init
FACILITY (Reject)
9.4.2 From network A
call clearing message (CCBSCall_RE (Error))
9.4.2 From network A
REJECT indication
Error = InvalidCCBS Reference
No
Yes
Release CCBS reference
CCNR Idle
CCNR Idle

Figure 1.7

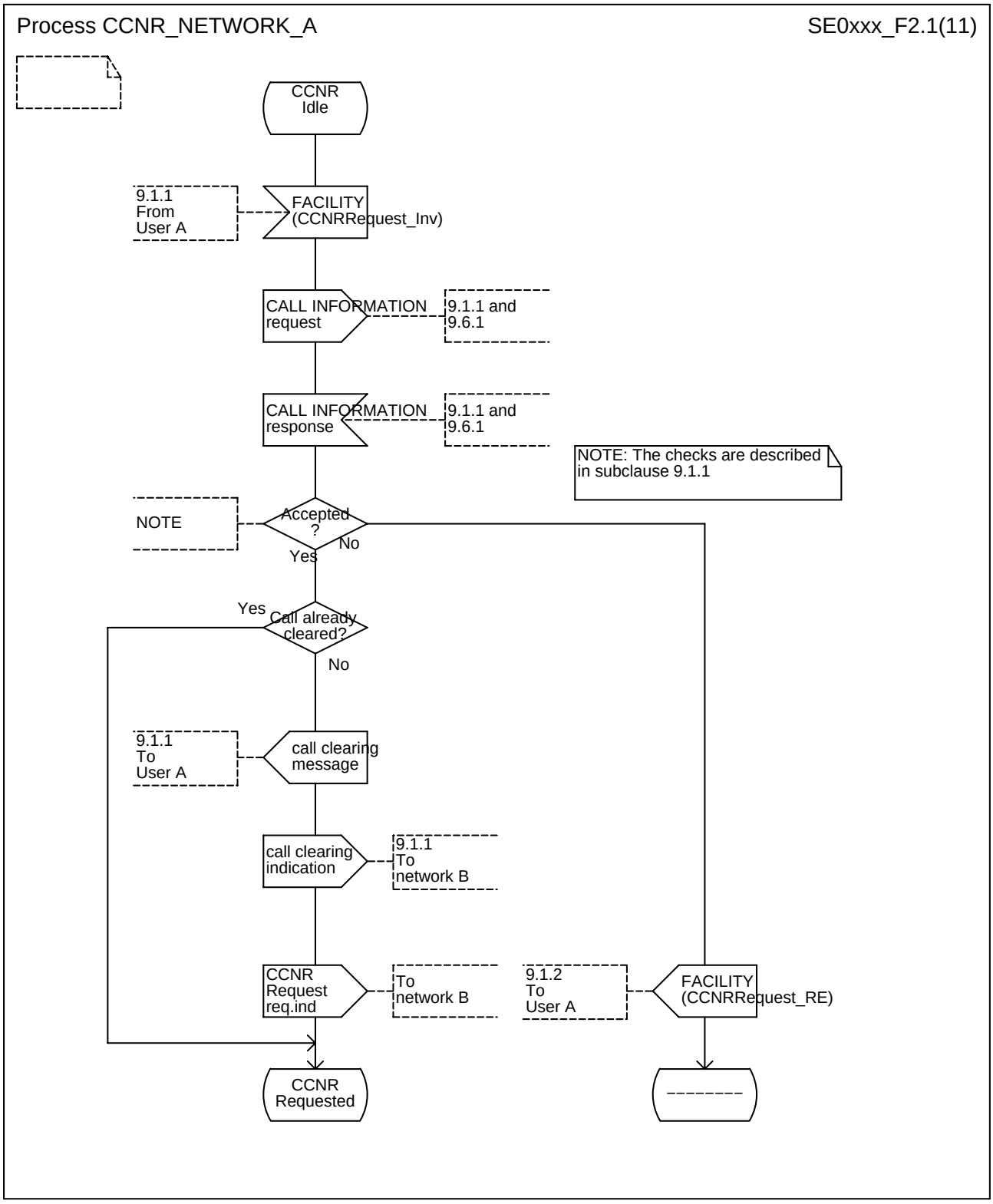

Process CCNR_NETWORK_A
SE0xxx_F2.1(11)
CCNR Idle
9.1.1 From User A
FACILITY (CCNRRequest_Inv)
CALL INFORMATION request
9.1.1 and 9.6.1
CALL INFORMATION response
9.1.1 and 9.6.1
NOTE: The checks are described in subclause 9.1.1
NOTE
Accepted ?
No
Yes
Yes
Call already cleared?
No
9.1.1 To User A
call clearing message
call clearing indication
9.1.1 To network B
CCNR Request req.ind
To network B
9.1.2 To User A
FACILITY (CCNRRequest_RE)
CCNR Requested
_____

Figure 2.1

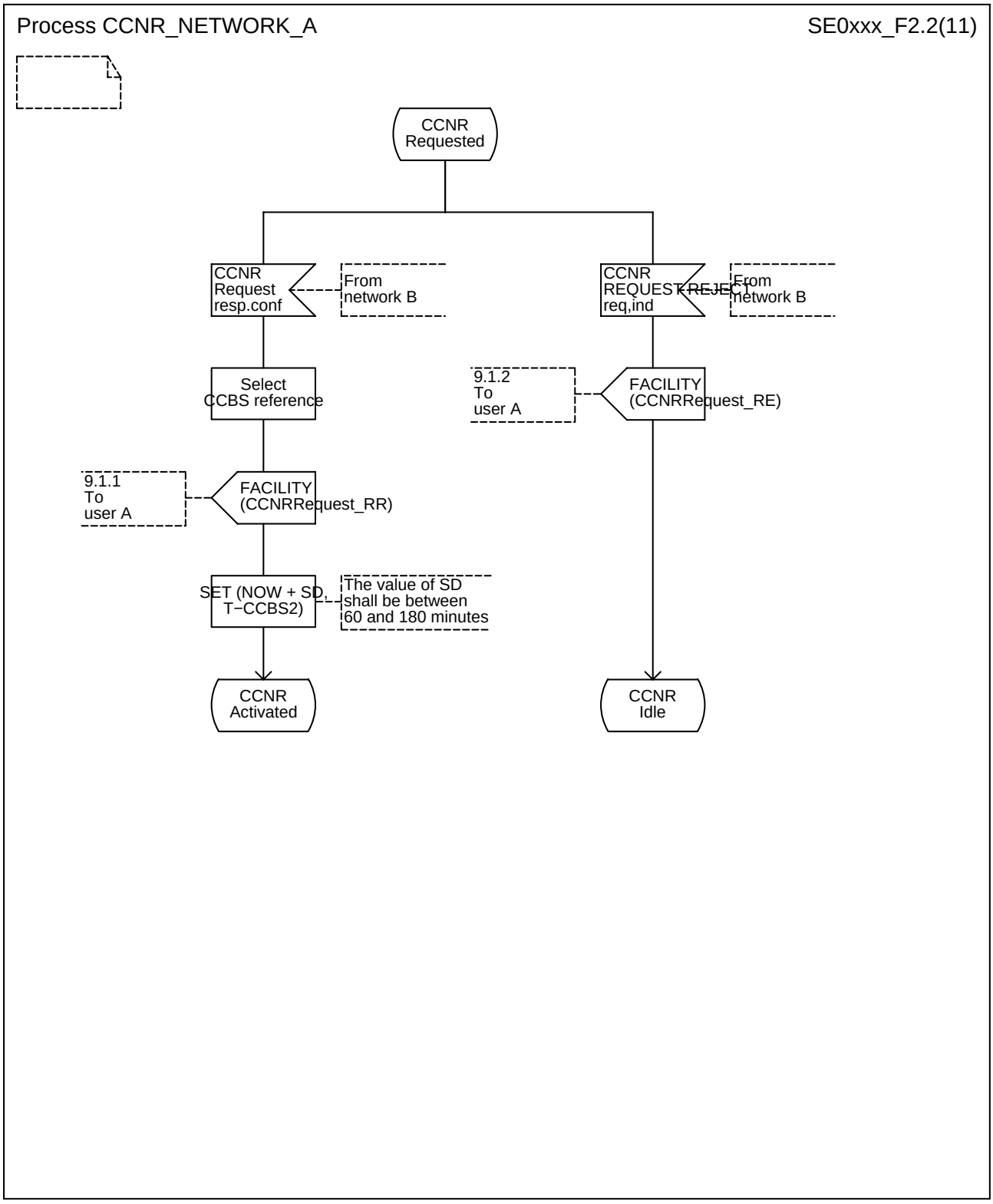

Process CCNR_NETWORK_A
SE0xxx_F2.2(11)
CCNR Requested
CCNR Request resp.conf
From network B
CCNR REQUEST REJECT req,ind
From network B
Select CCBS reference
9.1.2 To user A
FACILITY (CCNRRequest_RE)
9.1.1 To user A
FACILITY (CCNRRequest_RR)
SET (NOW + SD, T−CCBS2)
The value of SD shall be between 60 and 180 minutes
CCNR Activated
CCNR Idle

Figure 2.2

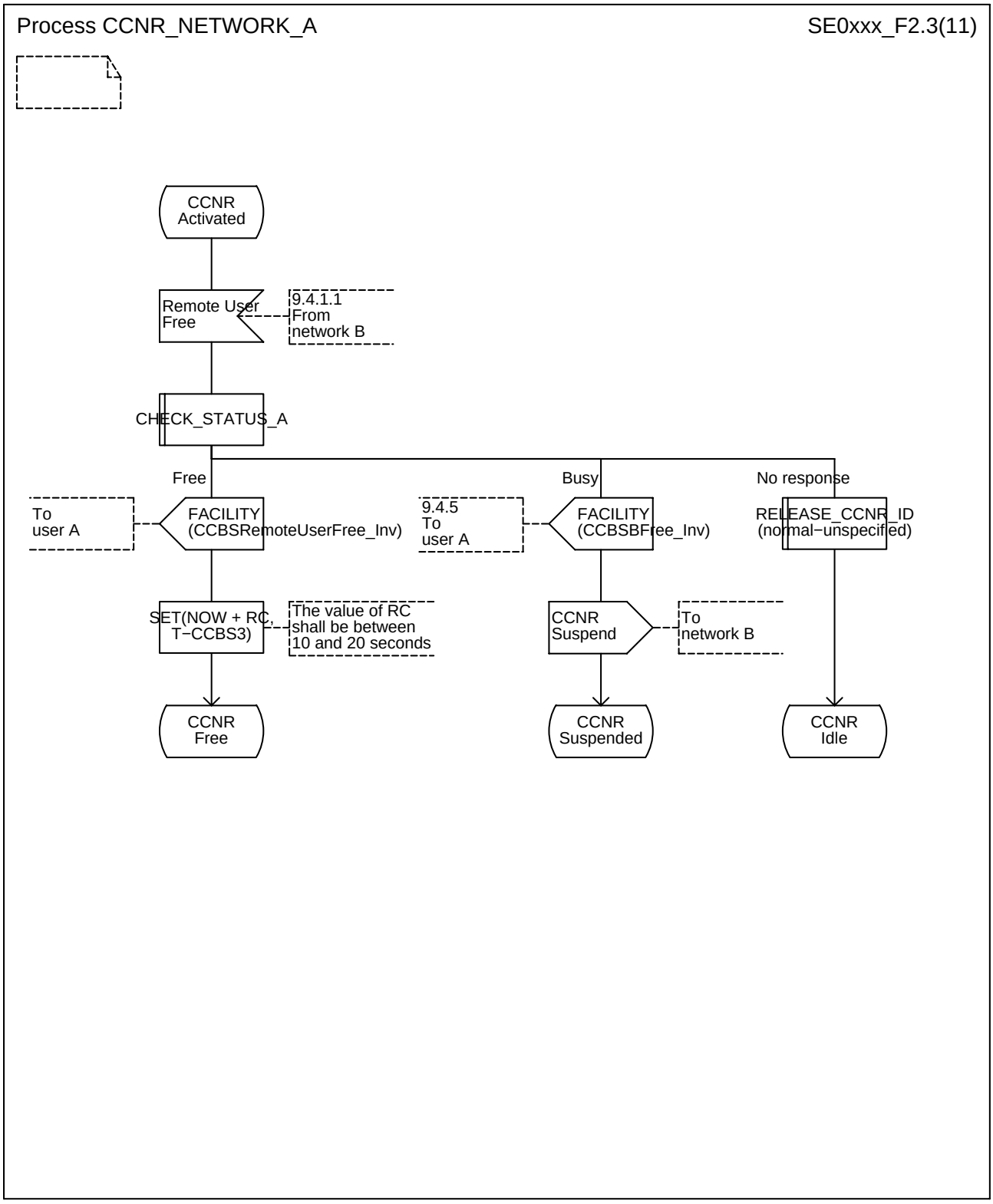

Process CCNR_NETWORK_A
SE0xxx_F2.3(11)
CCNR Activated
Remote User Free
9.4.1.1 From network B
CHECK_STATUS_A
Free
Busy
No response
To user A
FACILITY (CCBSRemoteUserFree_Inv)
9.4.5 To user A
FACILITY (CCBSBFree_Inv)
RELEASE_CCNR_ID (normal−unspecified)
SET(NOW + RC, T−CCBS3)
The value of RC shall be between 10 and 20 seconds
CCNR Suspend
To network B
CCNR Free
CCNR Suspended
CCNR Idle

Figure 2.3

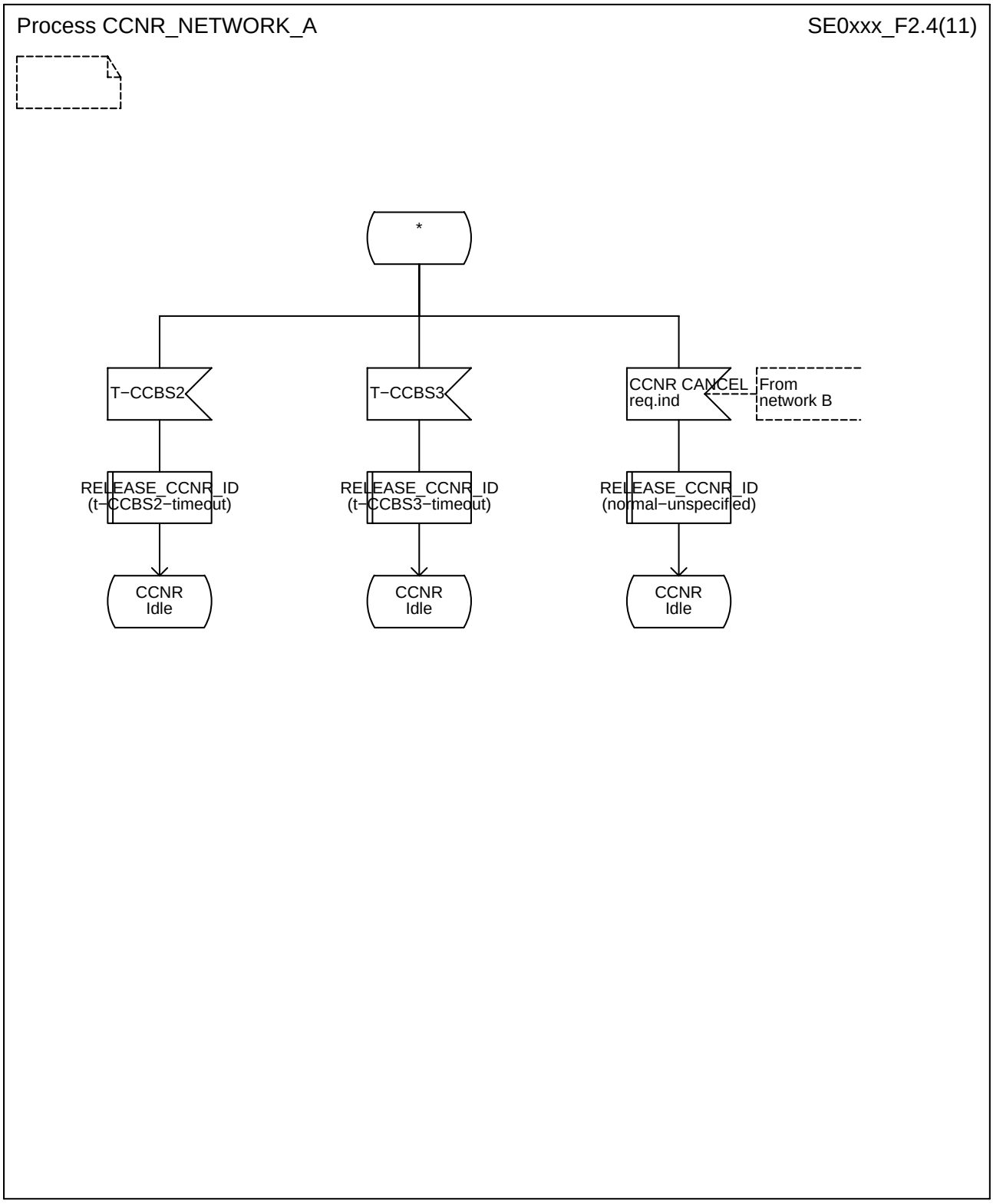

Process CCNR_NETWORK_A
SE0xxx_F2.4(11)
*
T−CCBS2
T−CCBS3
CCNR CANCEL
req.ind
From
network B
RELEASE_CCNR_ID
(t−CCBS2−timeout)
RELEASE_CCNR_ID
(t−CCBS3−timeout)
RELEASE_CCNR_ID
(normal−unspecified)
CCNR
Idle
CCNR
Idle
CCNR
Idle

Figure 2.4

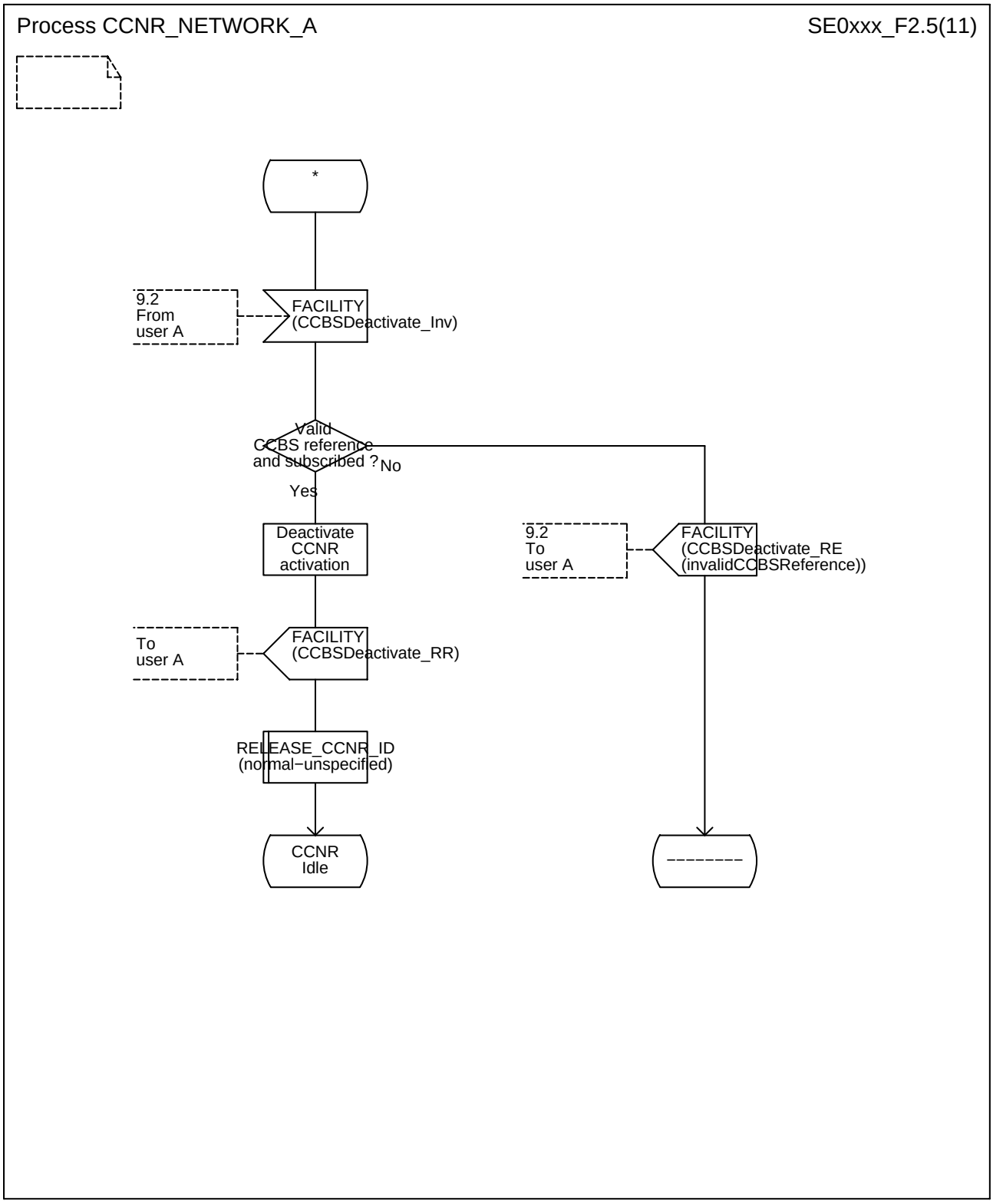

Process CCNR_NETWORK_A
SE0xxx_F2.5(11)
*
9.2
From
user A
FACILITY
(CCBSDeactivate_Inv)
Valid
CCBS reference
and subscribed ?
No
Yes
Deactivate
CCNR
activation
9.2
To
user A
FACILITY
(CCBSDeactivate_RE
(invalidCCBSReference))
To
user A
FACILITY
(CCBSDeactivate_RR)
RELEASE_CCNR_ID
(normal−unspecified)
CCNR
Idle
_ _ _ _ _ _ _ _

Figure 2.5

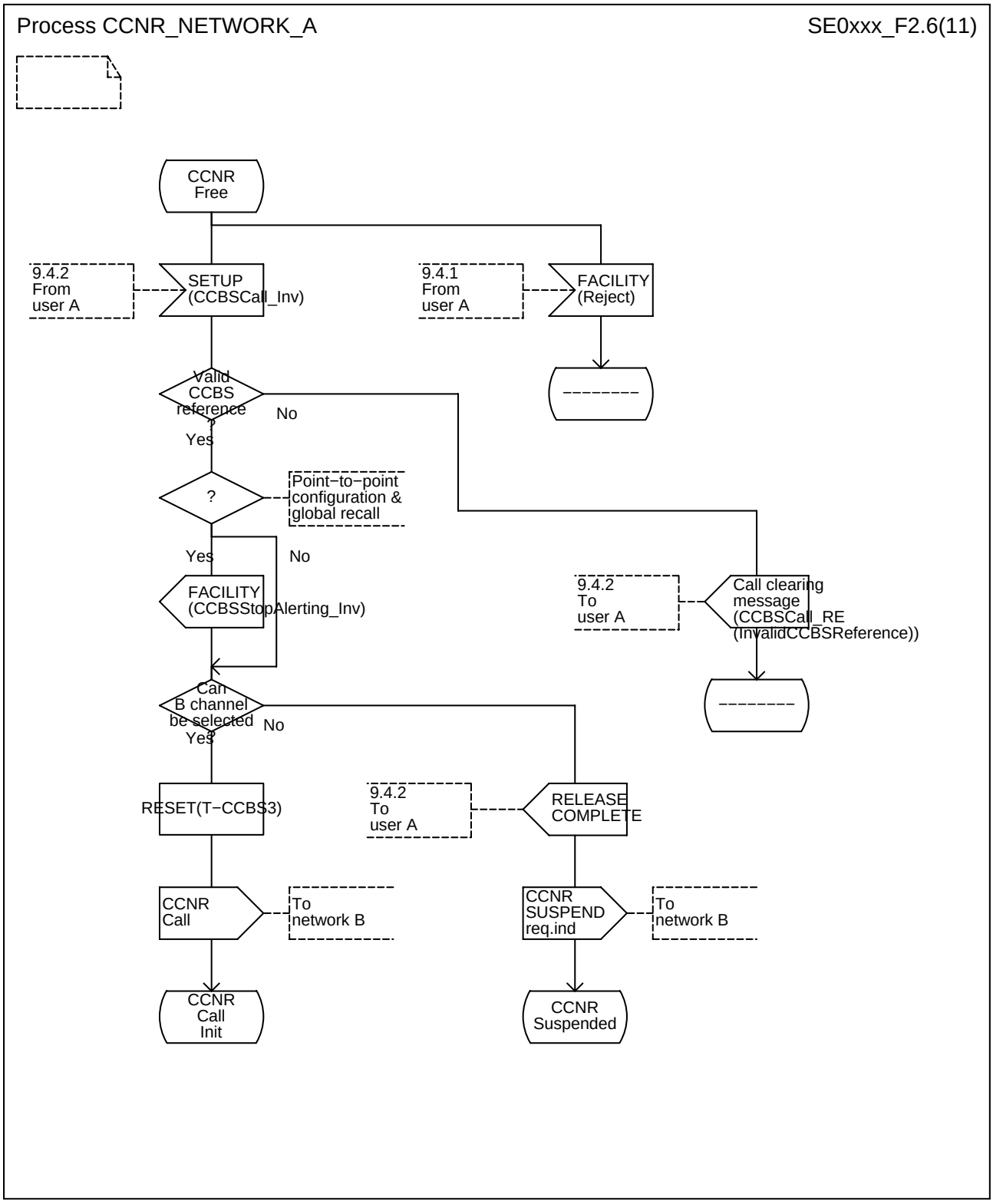

Process CCNR_NETWORK_A
SE0xxx_F2.6(11)
CCNR Free
9.4.2 From user A
SETUP (CCBSCall_Inv)
9.4.1 From user A
FACILITY (Reject)
Valid CCBS reference ?
No
Yes
?
Point−to−point configuration & global recall
Yes
No
FACILITY (CCBSStopAlerting_Inv)
9.4.2 To user A
Call clearing message (CCBSCall_RE (InvalidCCBSReference))
Can B channel be selected ?
No
Yes
RESET(T−CCBS3)
9.4.2 To user A
RELEASE COMPLETE
CCNR Call
To network B
CCNR SUSPEND req.ind
To network B
CCNR Call Init
CCNR Suspended

Figure 2.6

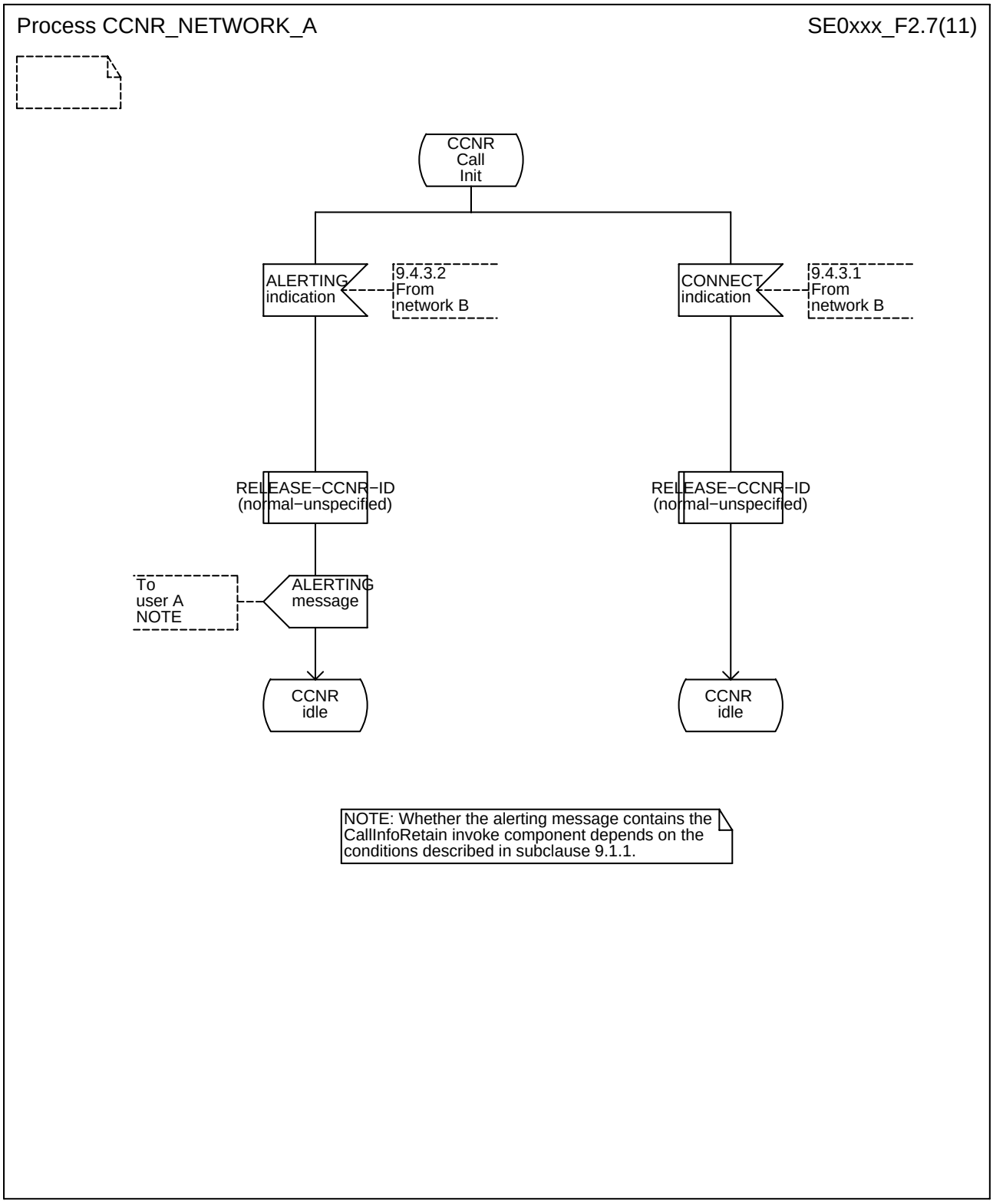

Process CCNR_NETWORK_A
SE0xxx_F2.7(11)
CCNR Call Init
ALERTING indication
9.4.3.2 From network B
CONNECT indication
9.4.3.1 From network B
RELEASE−CCNR−ID (normal−unspecified)
RELEASE−CCNR−ID (normal−unspecified)
To user A NOTE
ALERTING message
CCNR idle
CCNR idle
NOTE: Whether the alerting message contains the CallInfoRetain invoke component depends on the conditions described in subclause 9.1.1.

Figure 2.7

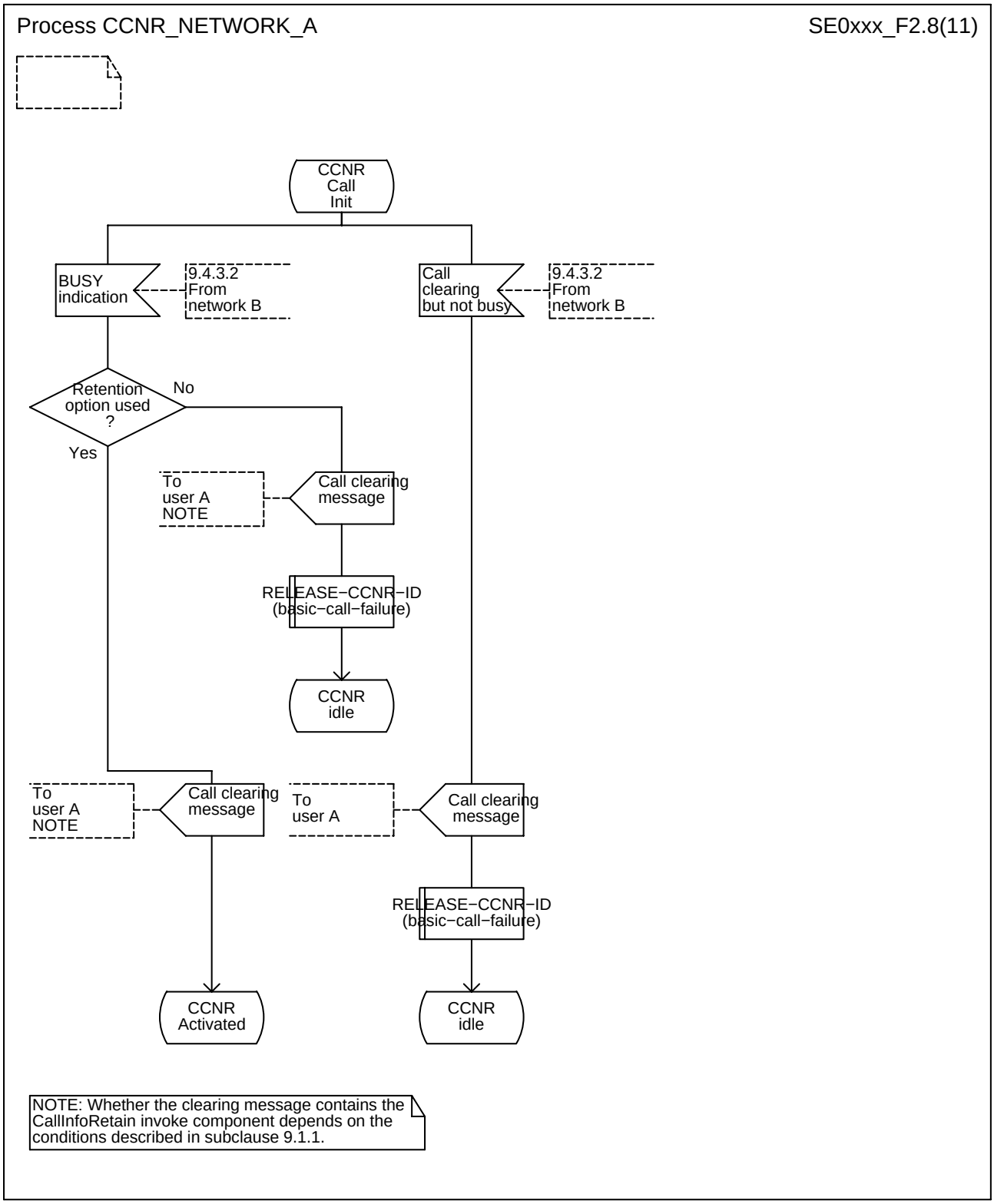

Process CCNR_NETWORK_A
SE0xxx_F2.8(11)
CCNR Call Init
BUSY indication
9.4.3.2 From network B
Call clearing but not busy
9.4.3.2 From network B
Retention option used ?
No
Yes
To user A NOTE
Call clearing message
RELEASE−CCNR−ID (basic−call−failure)
CCNR idle
To user A NOTE
Call clearing message
To user A
Call clearing message
RELEASE−CCNR−ID (basic−call−failure)
CCNR Activated
CCNR idle
NOTE: Whether the clearing message contains the CallInfoRetain invoke component depends on the conditions described in subclause 9.1.1.

Figure 2.8

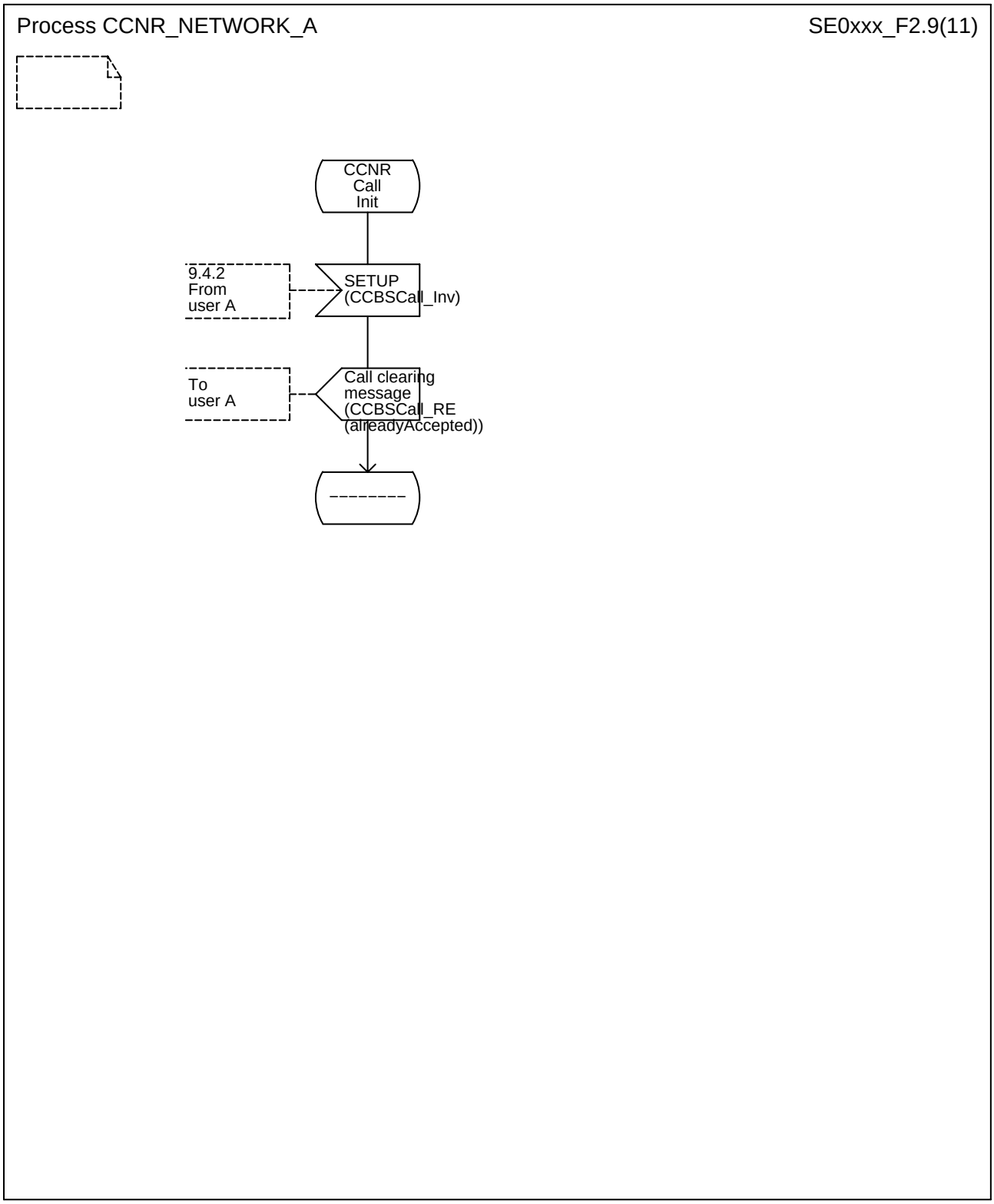

Process CCNR_NETWORK_A
SE0xxx_F2.9(11)
CCNR
Call
Init
9.4.2
From
user A
SETUP
(CCBSCall_Inv)
To
user A
Call clearing
message
(CCBSCall_RE
(alreadyAccepted))
_ _ _ _ _ _ _ _

Figure 2.9

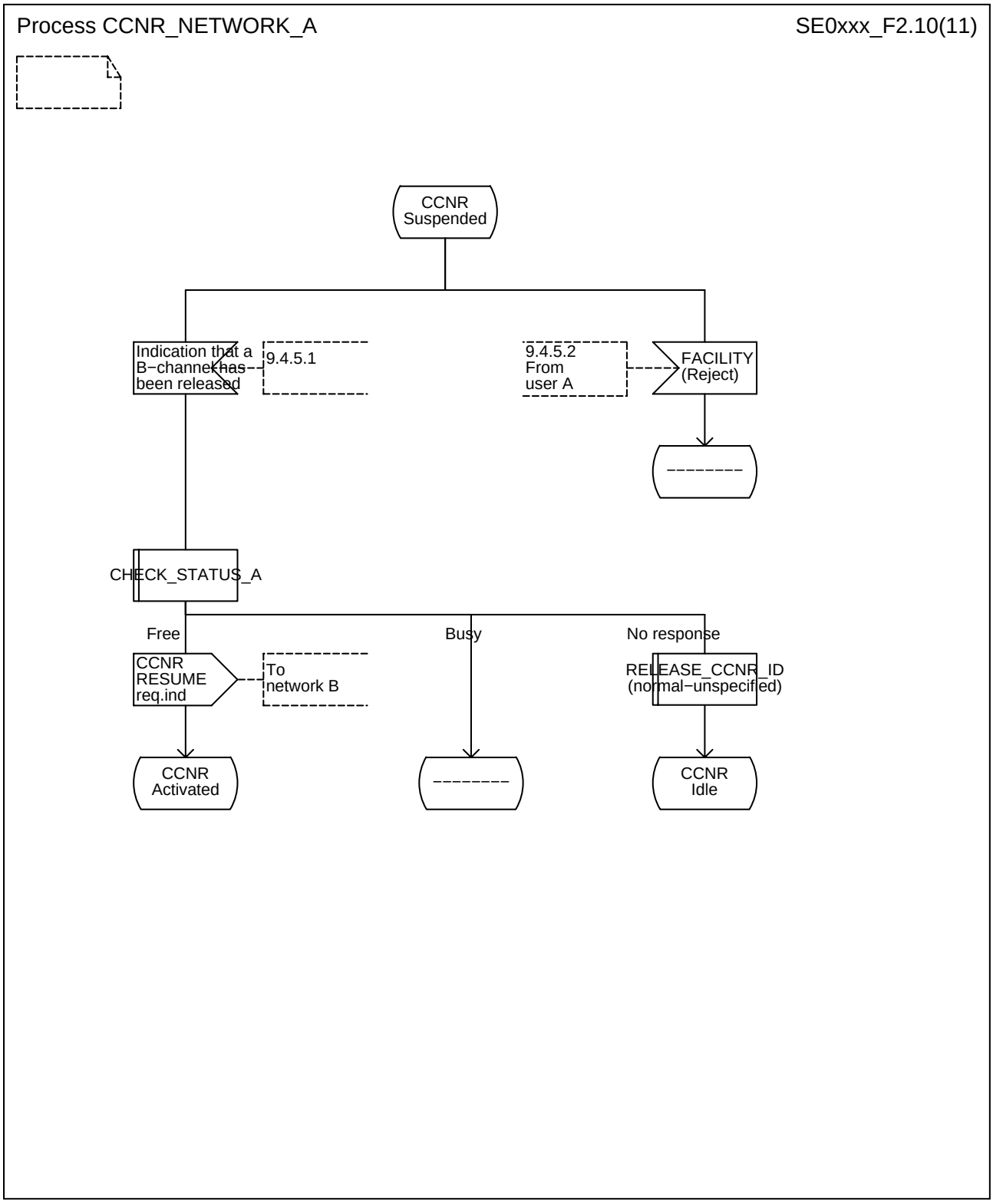

Process CCNR_NETWORK_A
SE0xxx_F2.10(11)
CCNR Suspended
Indication that a B−channel has been released
9.4.5.1
9.4.5.2 From user A
FACILITY (Reject)
CHECK_STATUS_A
Free
Busy
No response
CCNR RESUME req.ind
To network B
RELEASE_CCNR_ID (normal−unspecified)
CCNR Activated
CCNR Idle

Figure 2.10

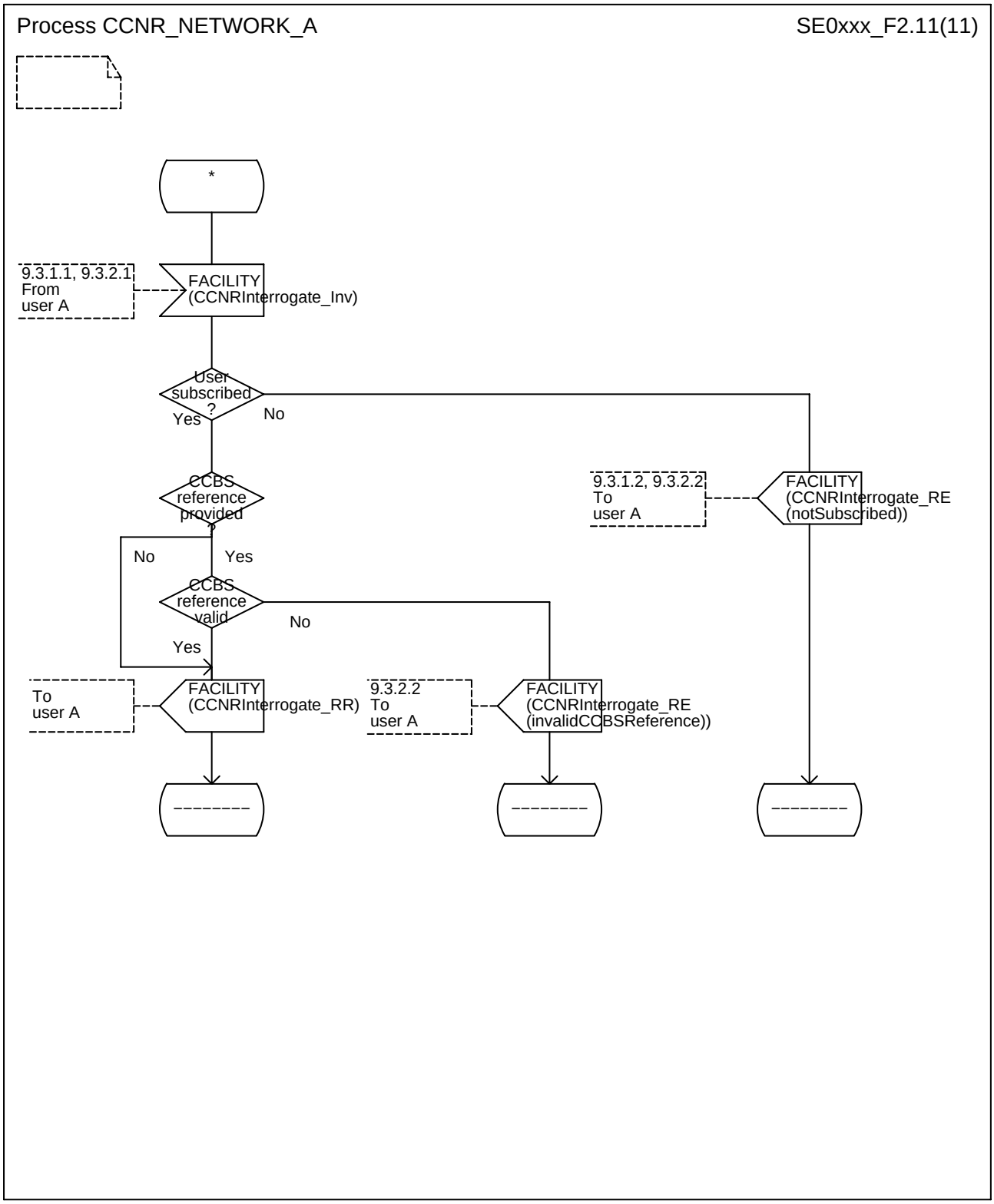

Process CCNR_NETWORK_A
SE0xxx_F2.11(11)
*
9.3.1.1, 9.3.2.1
From
user A
FACILITY
(CCNRInterrogate_Inv)
User
subscribed
?
Yes
No
CCBS
reference
provided
?
9.3.1.2, 9.3.2.2
To
user A
FACILITY
(CCNRInterrogate_RE
(notSubscribed))
No
Yes
CCBS
reference
valid
No
Yes
To
user A
FACILITY
(CCNRInterrogate_RR)
9.3.2.2
To
user A
FACILITY
(CCNRInterrogate_RE
(invalidCCBSReference))

Figure 2.11

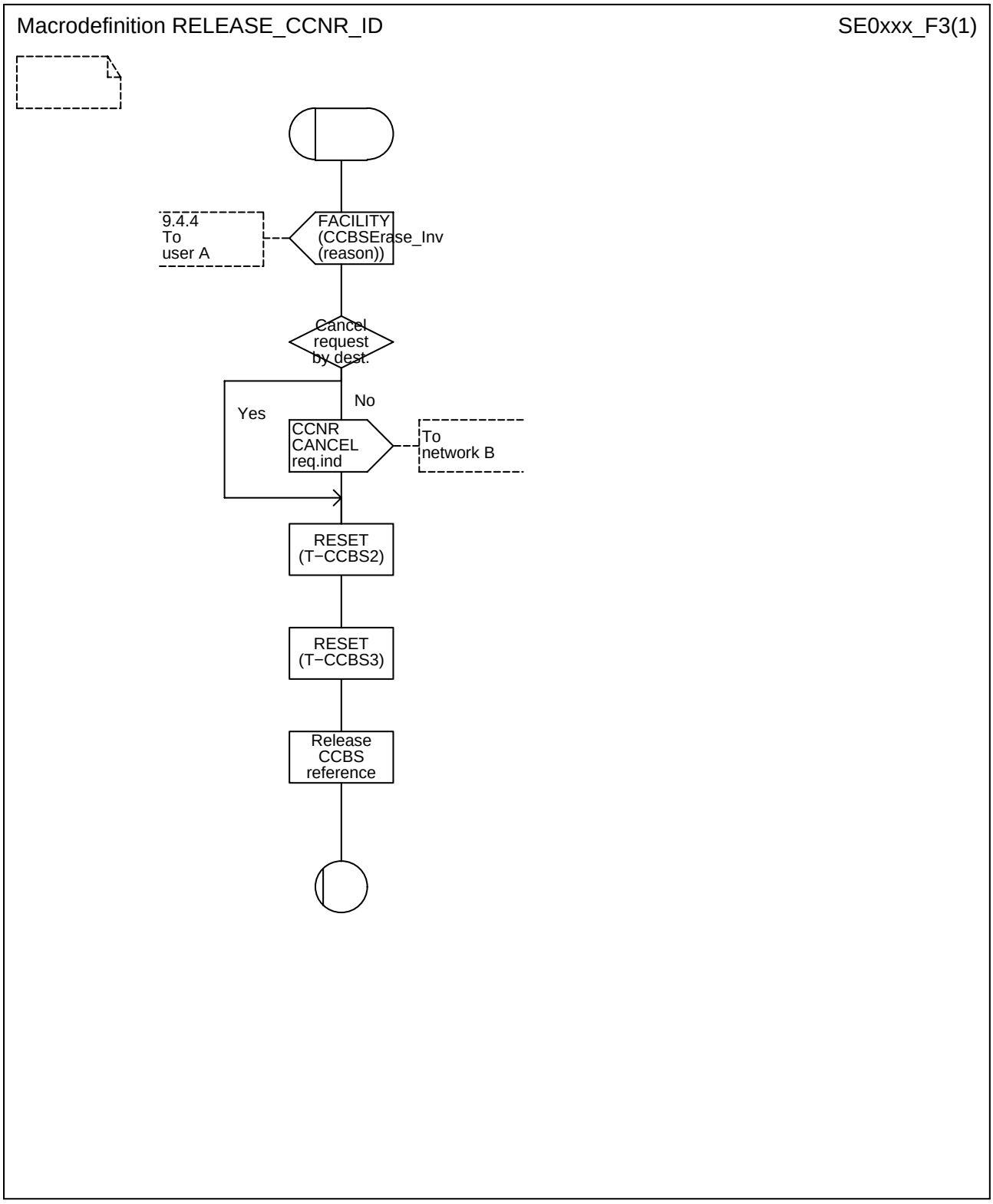

Macrodefinition RELEASE_CCNR_ID
SE0xxx_F3(1)
9.4.4
To
user A
FACILITY
(CCBSErase_Inv
(reason))
Cancel
request
by dest.
No
Yes
CCNR
CANCEL
req.ind
To
network B
RESET
(T−CCBS2)
RESET
(T−CCBS3)
Release
CCBS
reference

Figure 3

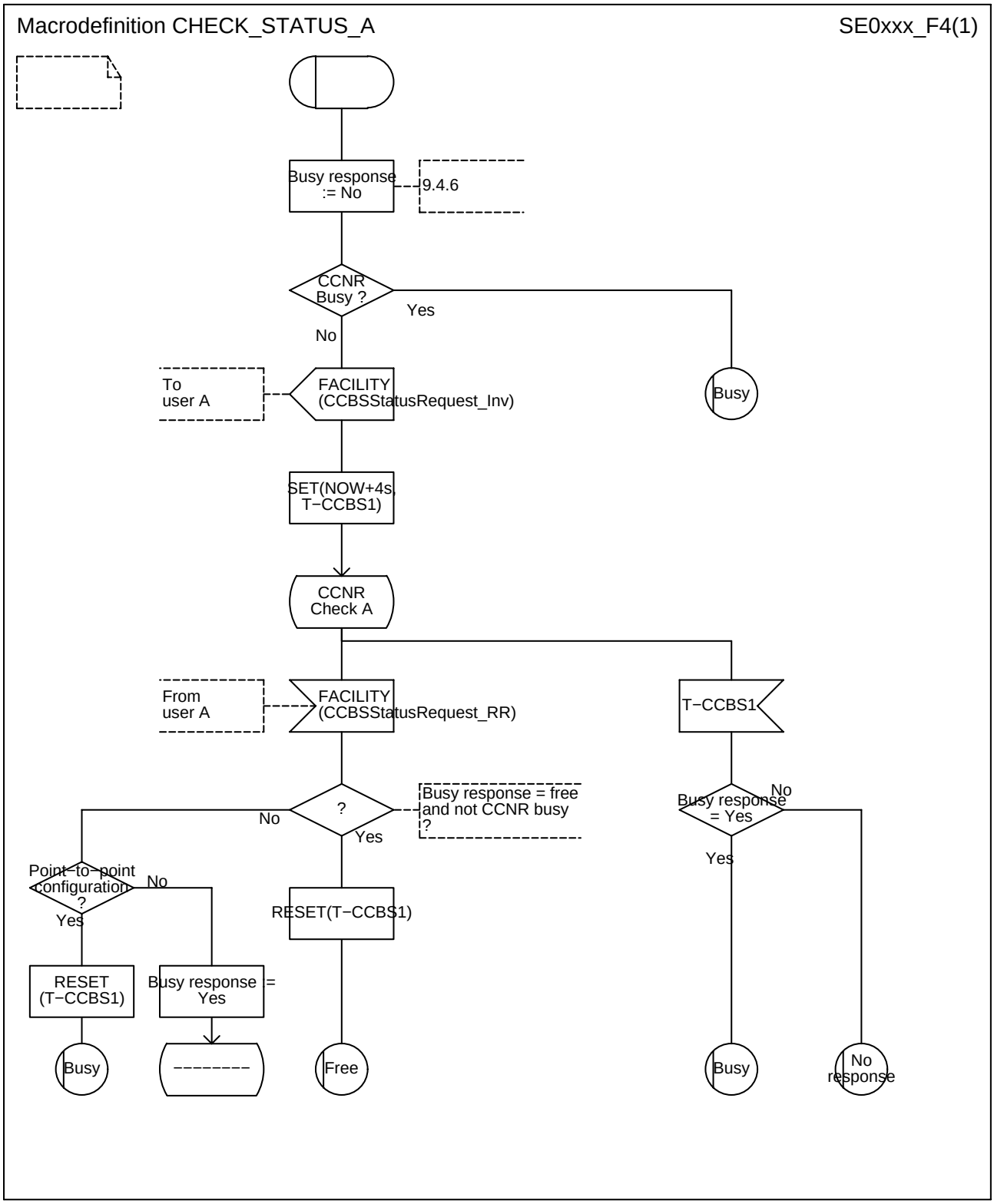

Macrodefinition CHECK_STATUS_A
SE0xxx_F4(1)
Busy response := No
9.4.6
CCNR Busy ?
Yes
No
To user A
FACILITY (CCBSStatusRequest_Inv)
Busy
SET(NOW+4s, T−CCBS1)
CCNR Check A
From user A
FACILITY (CCBSStatusRequest_RR)
T−CCBS1
?
Busy response = free and not CCNR busy ?
No
Yes
Busy response = Yes
No
Yes
Point−to−point configuration ?
No
Yes
RESET(T−CCBS1)
RESET (T−CCBS1)
Busy response = Yes
Busy
Free
Busy
No response

Figure 4

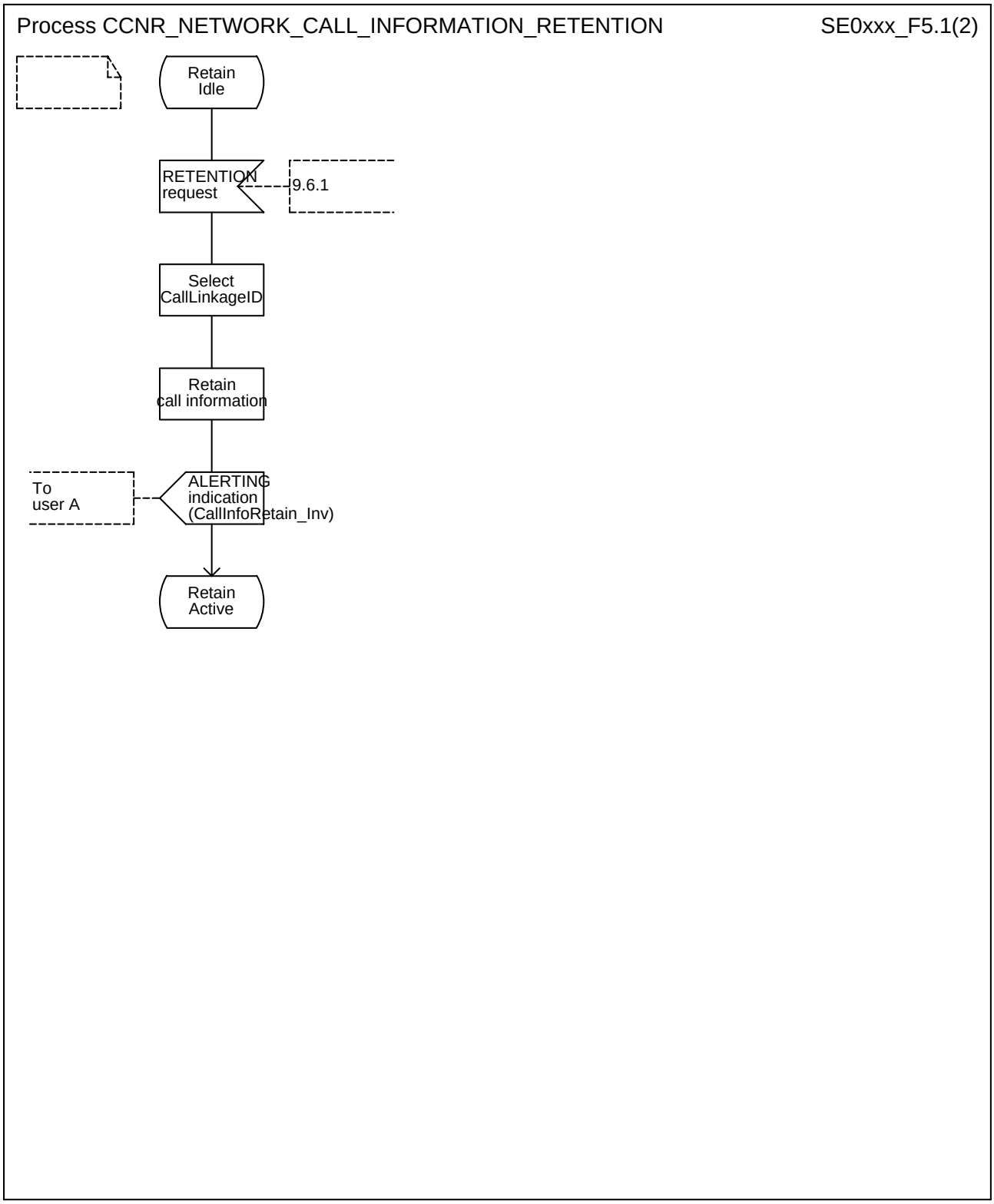

Process CCNR_NETWORK_CALL_INFORMATION_RETENTION
SE0xxx_F5.1(2)
Retain Idle
RETENTION request
9.6.1
Select CallLinkageID
Retain call information
To user A
ALERTING indication (CallInfoRetain_Inv)
Retain Active

Figure 5.1

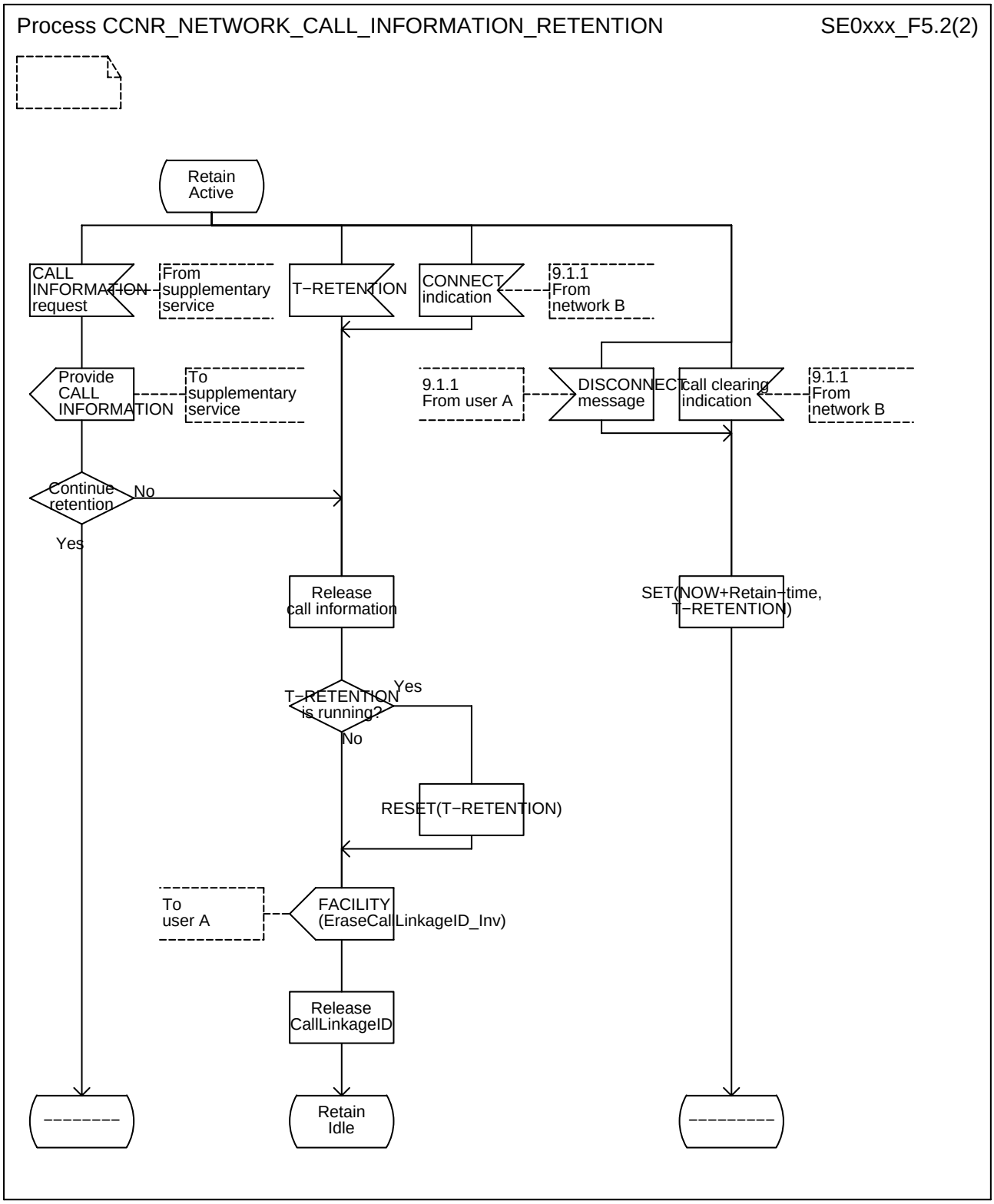

Process CCNR_NETWORK_CALL_INFORMATION_RETENTION
SE0xxx_F5.2(2)
Retain Active
CALL INFORMATION request
From supplementary service
T−RETENTION
CONNECT indication
9.1.1 From network B
Provide CALL INFORMATION
To supplementary service
9.1.1 From user A
DISCONNECT message
Call clearing indication
9.1.1 From network B
Continue retention
No
Yes
Release call information
SET(NOW+Retain−time, T−RETENTION)
T−RETENTION is running?
Yes
No
RESET(T−RETENTION)
To user A
FACILITY (EraseCallLinkageID_Inv)
Release CallLinkageID
Retain Idle

Figure 5.2

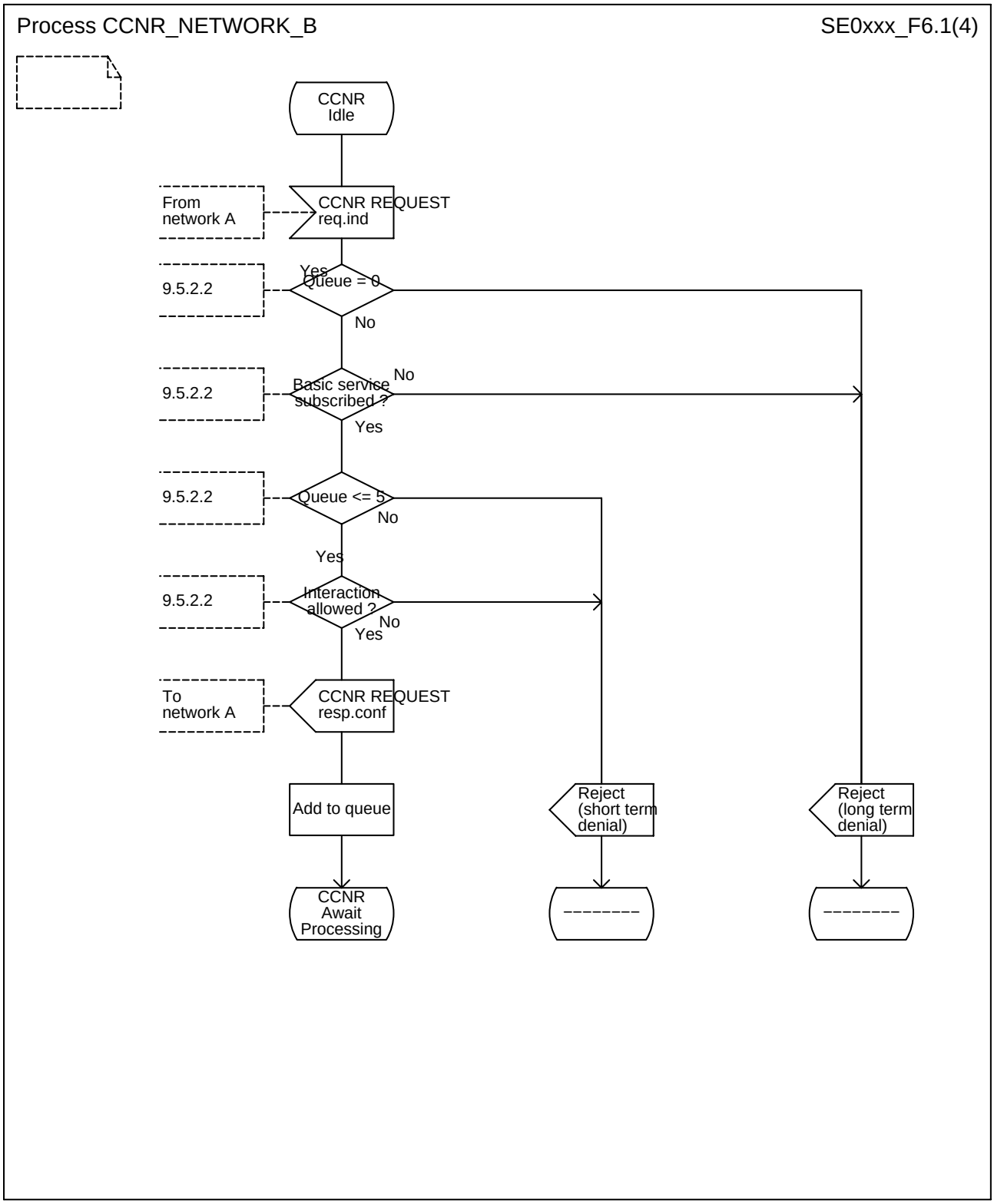

Process CCNR_NETWORK_B
SE0xxx_F6.1(4)
CCNR Idle
From network A
CCNR REQUEST req.ind
9.5.2.2
Queue = 0
Yes
No
9.5.2.2
Basic service subscribed ?
No
Yes
9.5.2.2
Queue <= 5
No
Yes
9.5.2.2
Interaction allowed ?
No
Yes
To network A
CCNR REQUEST resp.conf
Add to queue
Reject (short term denial)
Reject (long term denial)
CCNR Await Processing

Figure 6.1

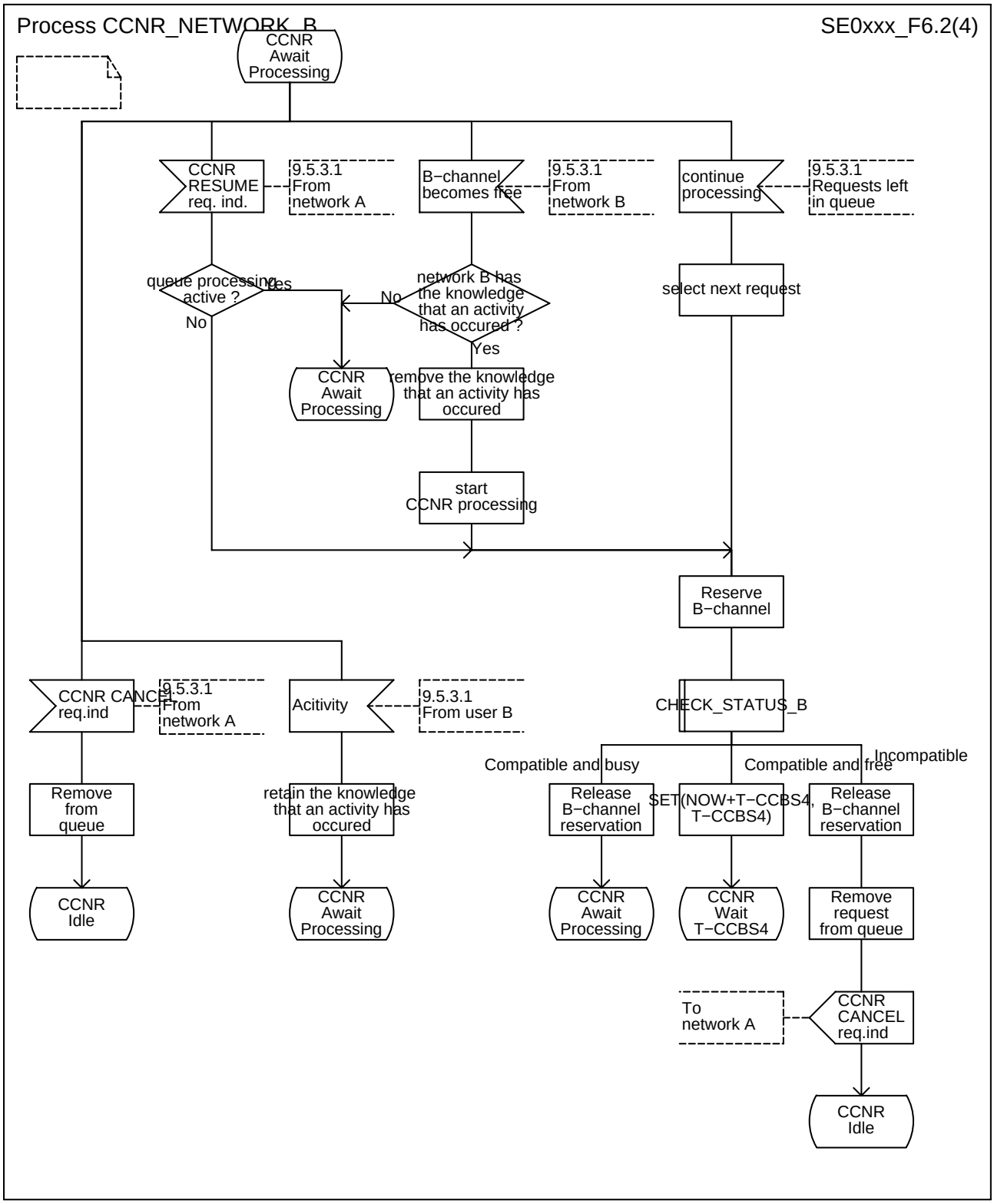

Process CCNR_NETWORK_B
SE0xxx_F6.2(4)
CCNR Await Processing
CCNR RESUME req. ind.
9.5.3.1 From network A
B−channel becomes free
9.5.3.1 From network B
continue processing
9.5.3.1 Requests left in queue
queue processing active ?
Yes
No
network B has the knowledge that an activity has occured ?
No
Yes
select next request
CCNR Await Processing
remove the knowledge that an activity has occured
start CCNR processing
Reserve B−channel
CCNR CANCEL req.ind
9.5.3.1 From network A
Acitivity
9.5.3.1 From user B
CHECK_STATUS_B
Compatible and busy
Compatible and free
Incompatible
Remove from queue
retain the knowledge that an activity has occured
Release B−channel reservation
SET(NOW+T−CCBS4, T−CCBS4)
Release B−channel reservation
CCNR Idle
CCNR Await Processing
CCNR Await Processing
CCNR Wait T−CCBS4
Remove request from queue
To network A
CCNR CANCEL req.ind
CCNR Idle

Figure 6.2

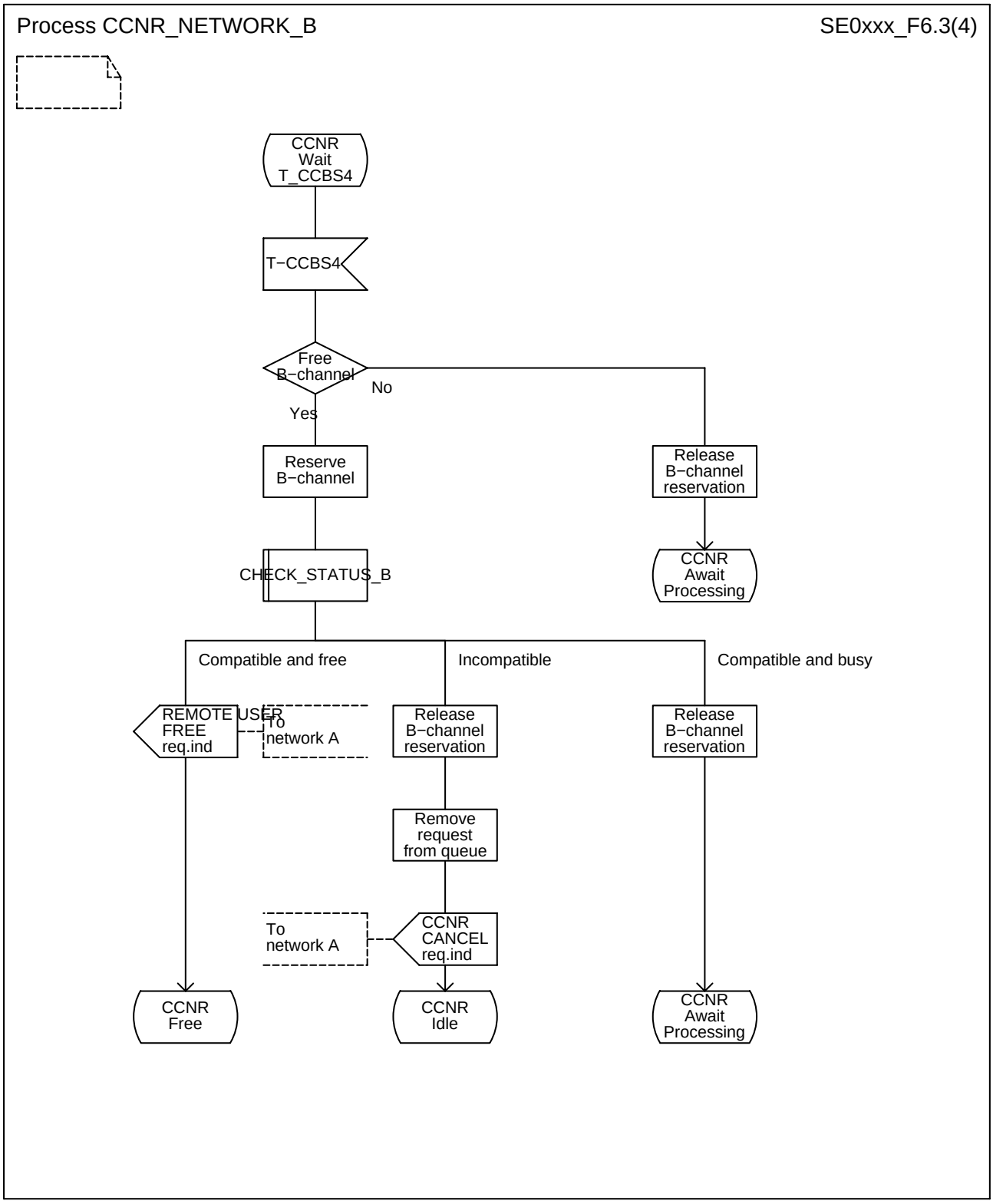

Process CCNR_NETWORK_B
SE0xxx_F6.3(4)
CCNR Wait T_CCBS4
T−CCBS4
Free B−channel
No
Yes
Reserve B−channel
Release B−channel reservation
CHECK_STATUS_B
CCNR Await Processing
Compatible and free
Incompatible
Compatible and busy
REMOTE USER FREE req.ind
To network A
Release B−channel reservation
Release B−channel reservation
Remove request from queue
To network A
CCNR CANCEL req.ind
CCNR Free
CCNR Idle
CCNR Await Processing

Figure 6.3

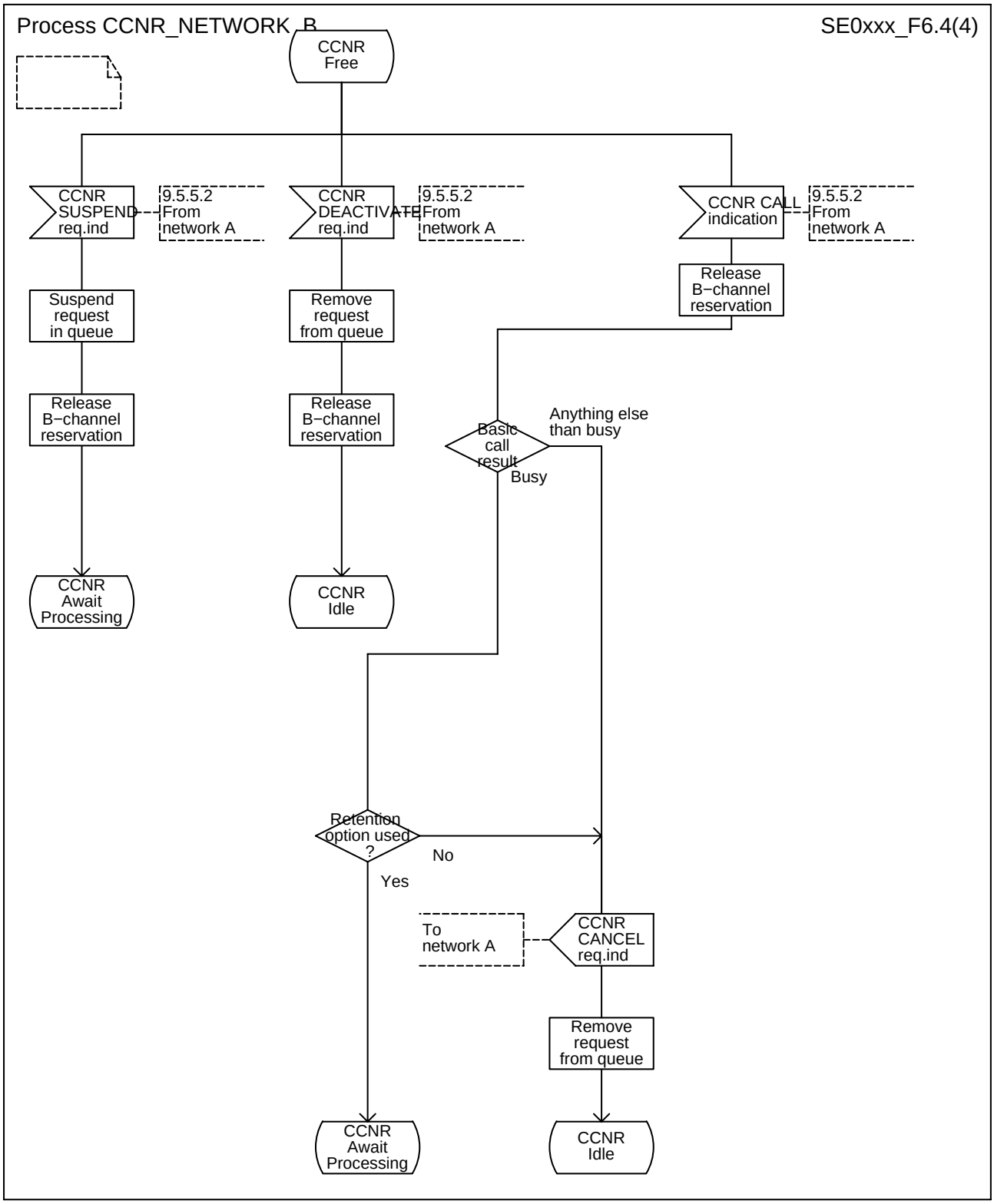

Process CCNR_NETWORK_B
SE0xxx_F6.4(4)
CCNR Free
CCNR SUSPEND req.ind
9.5.5.2 From network A
CCNR DEACTIVATE req.ind
9.5.5.2 From network A
CCNR CALL indication
9.5.5.2 From network A
Suspend request in queue
Remove request from queue
Release B−channel reservation
Release B−channel reservation
Release B−channel reservation
Basic call result
Anything else than busy
Busy
CCNR Await Processing
CCNR Idle
Retention option used ?
No
Yes
To network A
CCNR CANCEL req.ind
Remove request from queue
CCNR Await Processing
CCNR Idle

Figure 6.4

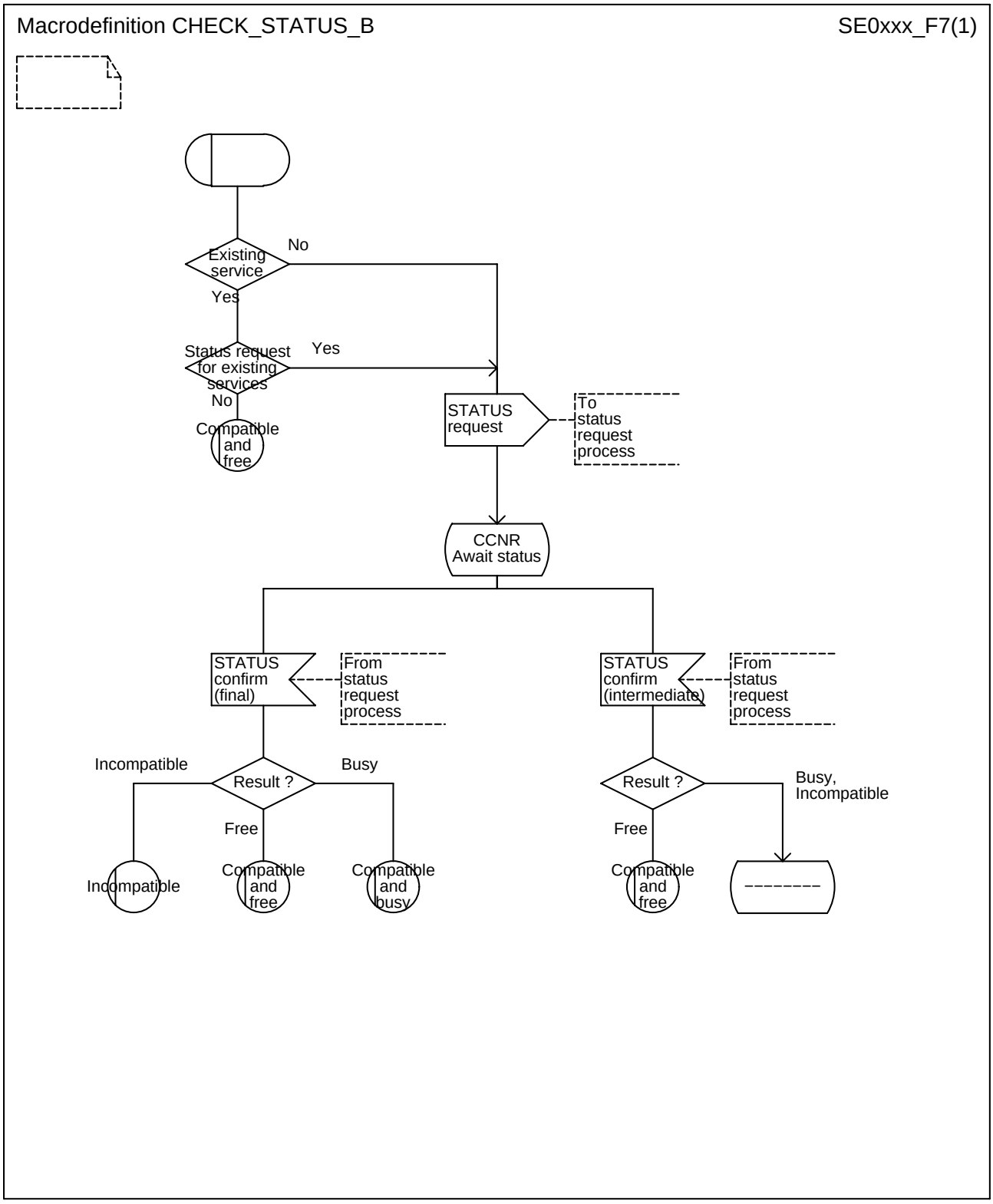

Macrodefinition CHECK_STATUS_B
SE0xxx_F7(1)
Existing service
No
Yes
Status request for existing services
Yes
No
Compatible and free
STATUS request
To status request process
CCNR Await status
STATUS confirm (final)
From status request process
STATUS confirm (intermediate)
From status request process
Incompatible
Result ?
Busy
Free
Incompatible
Compatible and free
Compatible and busy
Result ?
Busy, Incompatible
Free
Compatible and free

Figure 7

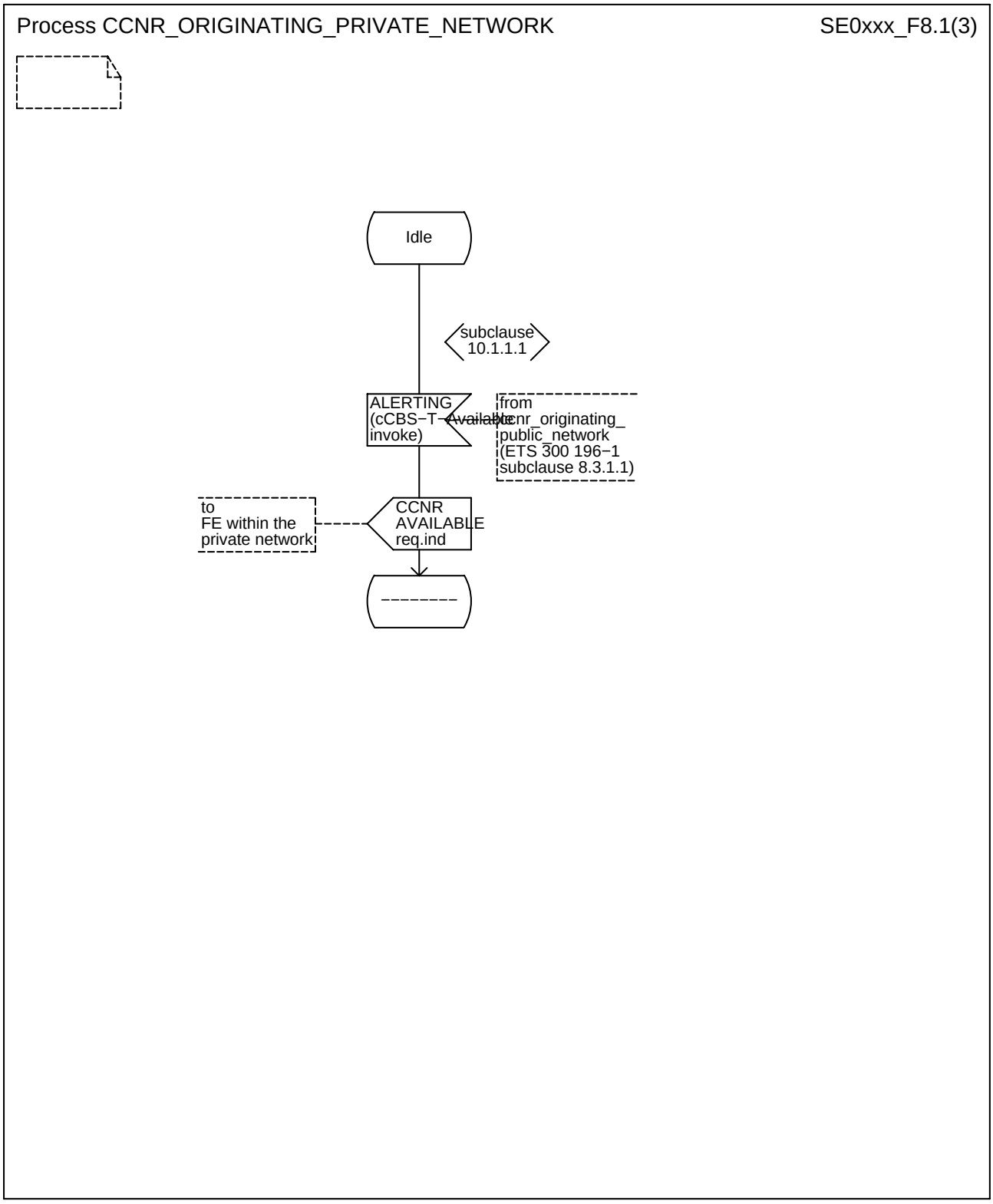

Process CCNR_ORIGINATING_PRIVATE_NETWORK
SE0xxx_F8.1(3)
Idle
subclause
10.1.1.1
ALERTING
(cCBS−T−Available
invoke)
from
ccnr_originating_
public_network
(ETS 300 196−1
subclause 8.3.1.1)
to
FE within the
private network
CCNR
AVAILABLE
req.ind

Figure 8.1

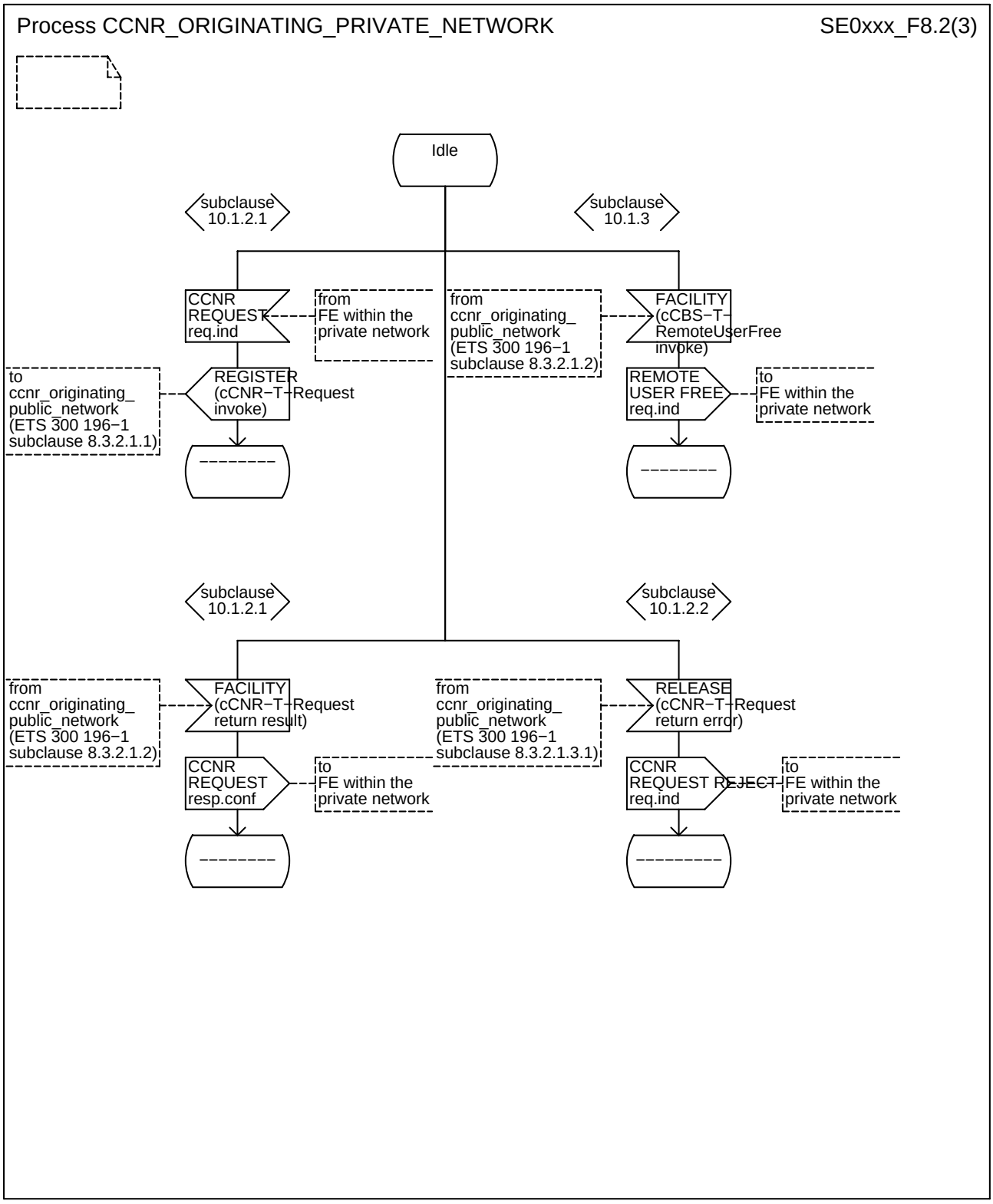

Process CCNR_ORIGINATING_PRIVATE_NETWORK
SE0xxx_F8.2(3)
Idle
subclause 10.1.2.1
subclause 10.1.3
CCNR REQUEST req.ind
from FE within the private network
from ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−RemoteUserFree invoke)
to ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.1)
REGISTER (cCNR−T−Request invoke)
REMOTE USER FREE req.ind
to FE within the private network
subclause 10.1.2.1
subclause 10.1.2.2
from ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCNR−T−Request return result)
from ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.3.1)
RELEASE (cCNR−T−Request return error)
CCNR REQUEST resp.conf
to FE within the private network
CCNR REQUEST REJECT req.ind
to FE within the private network

Figure 8.2

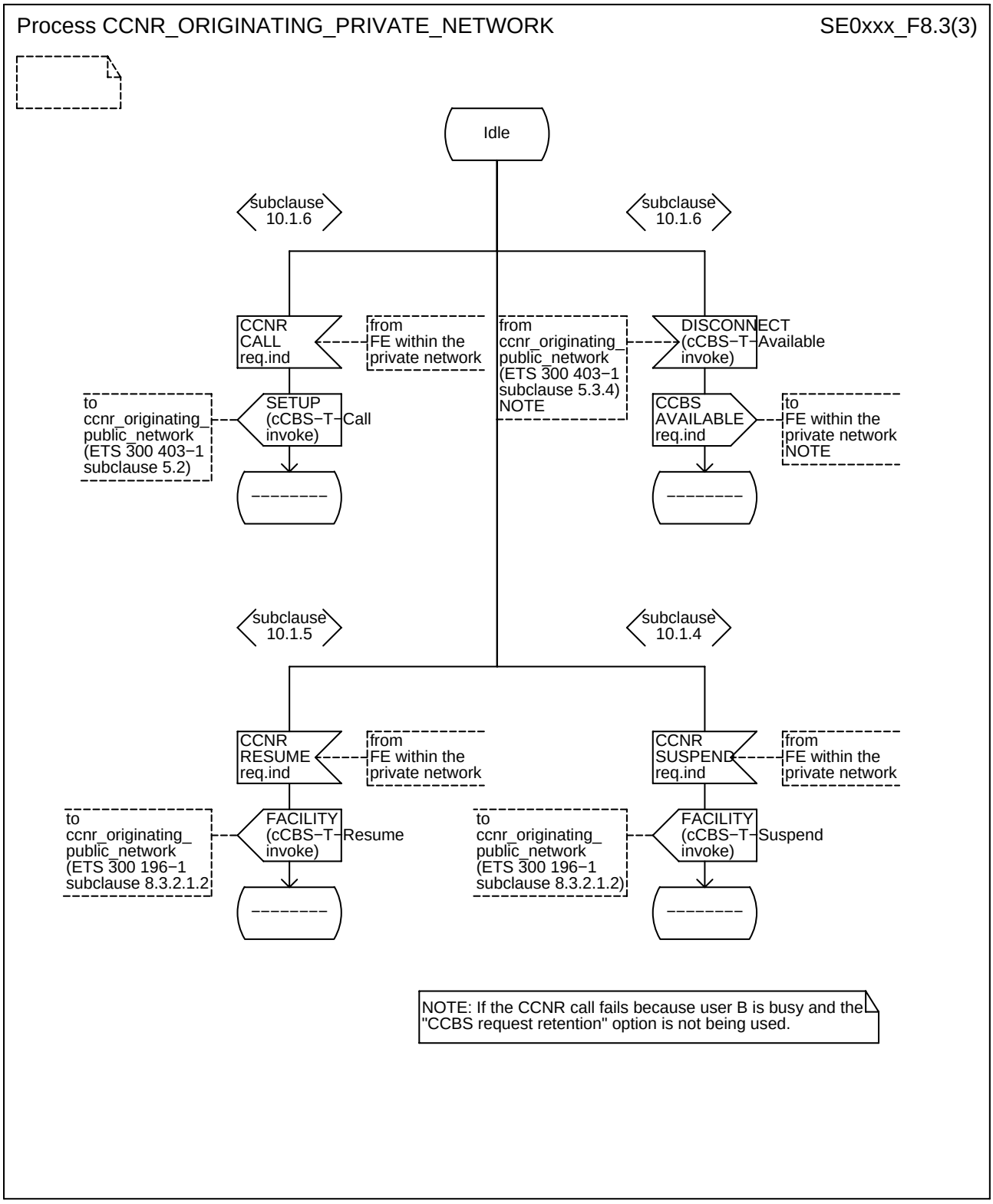

Process CCNR_ORIGINATING_PRIVATE_NETWORK
SE0xxx_F8.3(3)
Idle
subclause 10.1.6
subclause 10.1.6
CCNR CALL req.ind
from FE within the private network
from ccnr_originating_ public_network (ETS 300 403−1 subclause 5.3.4) NOTE
DISCONNECT (cCBS−T Available invoke)
to ccnr_originating_ public_network (ETS 300 403−1 subclause 5.2)
SETUP (cCBS−T Call invoke)
CCBS AVAILABLE req.ind
to FE within the private network NOTE
subclause 10.1.5
subclause 10.1.4
CCNR RESUME req.ind
from FE within the private network
CCNR SUSPEND req.ind
from FE within the private network
to ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T Resume invoke)
to ccnr_originating_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T Suspend invoke)
NOTE: If the CCNR call fails because user B is busy and the "CCBS request retention" option is not being used.

Figure 8.3

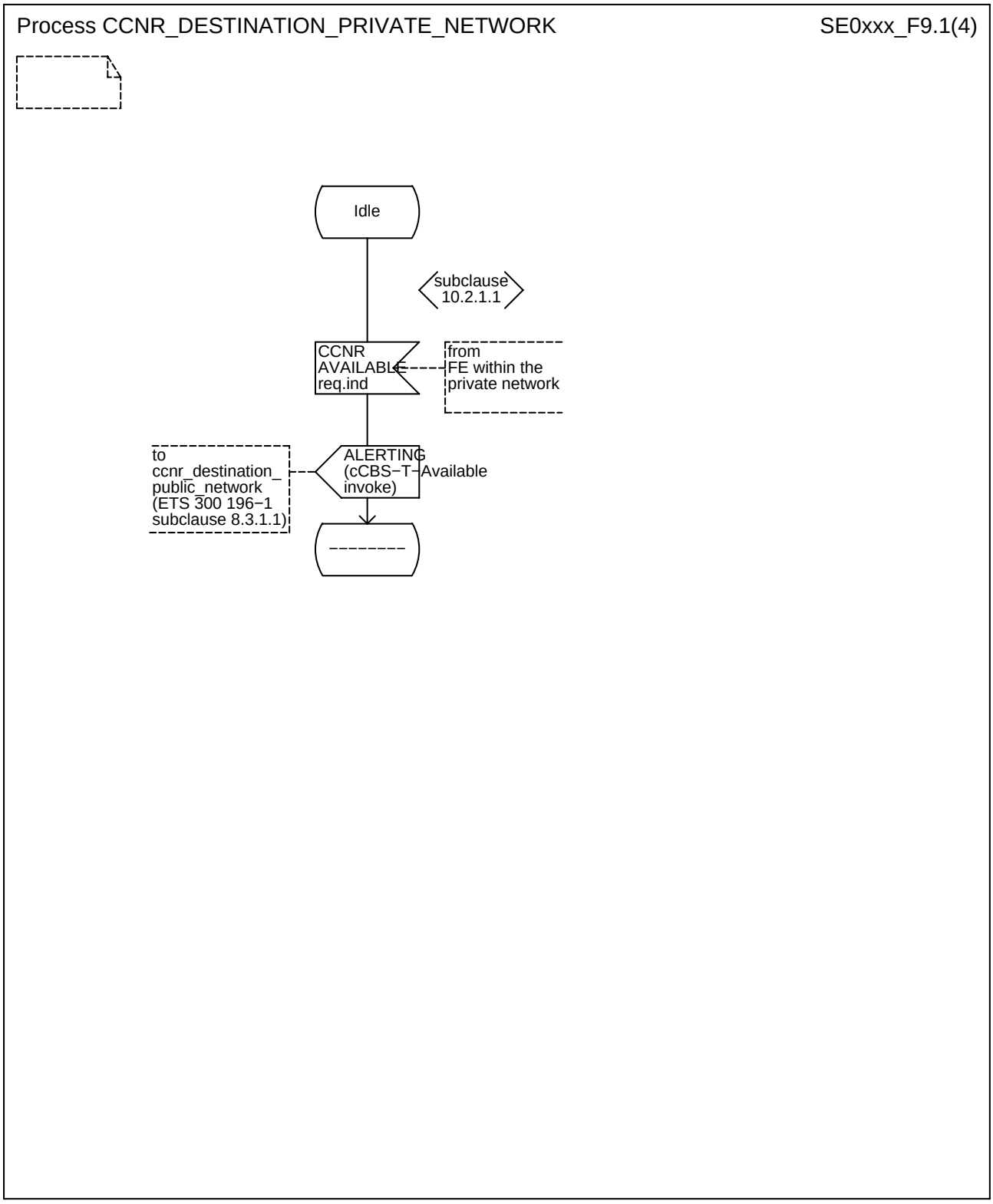

Process CCNR_DESTINATION_PRIVATE_NETWORK
SE0xxx_F9.1(4)
Idle
subclause
10.2.1.1
CCNR
AVAILABLE
req.ind
from
FE within the
private network
to
ccnr_destination_
public_network
(ETS 300 196−1
subclause 8.3.1.1)
ALERTING
(cCBS−T−Available
invoke)

Figure 9.1

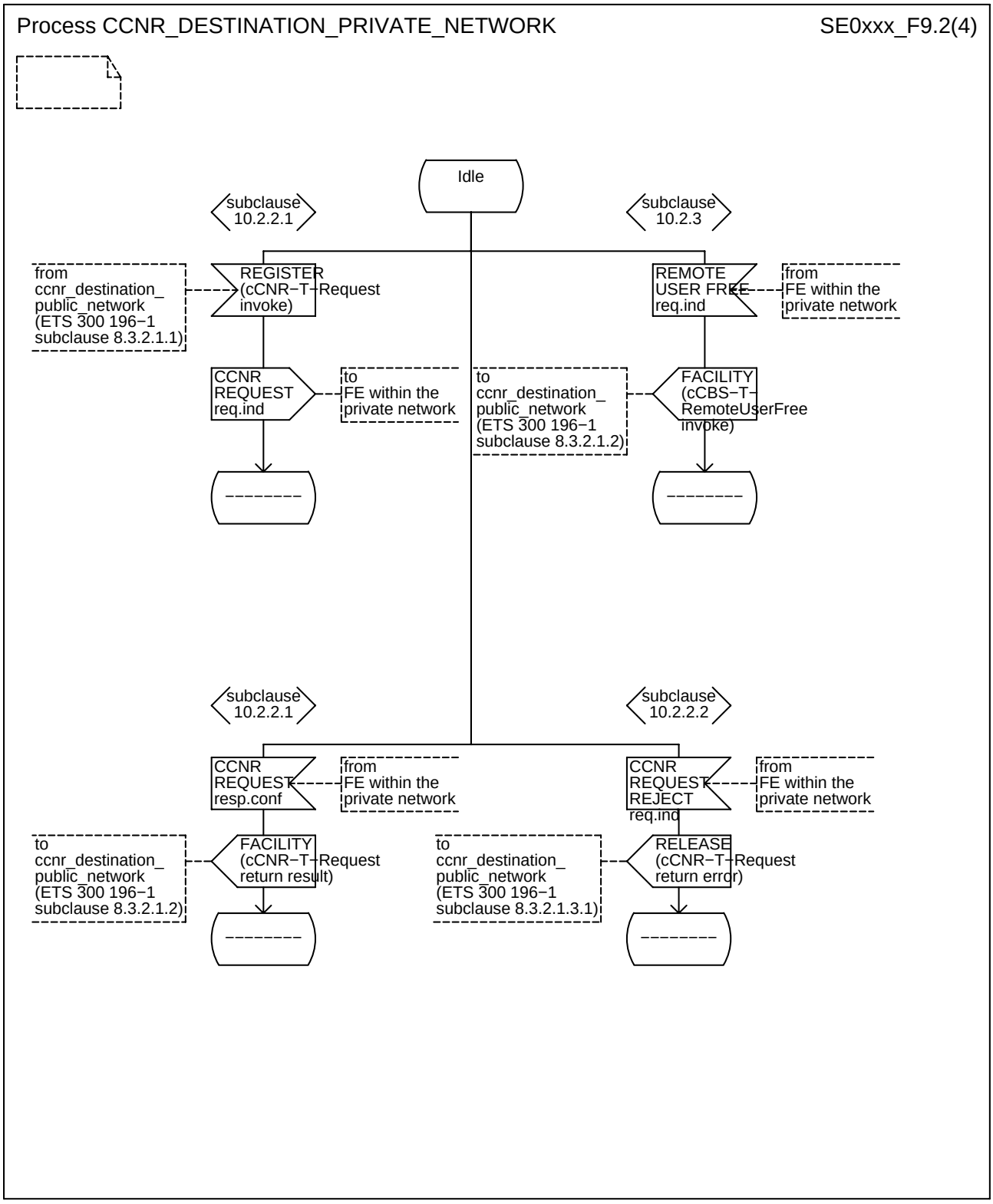

Process CCNR_DESTINATION_PRIVATE_NETWORK
SE0xxx_F9.2(4)
Idle
subclause 10.2.2.1
subclause 10.2.3
from ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.1)
REGISTER (cCNR−T−Request invoke)
REMOTE USER FREE req.ind
from FE within the private network
CCNR REQUEST req.ind
to FE within the private network
to ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−RemoteUserFree invoke)
subclause 10.2.2.1
subclause 10.2.2.2
CCNR REQUEST resp.conf
from FE within the private network
CCNR REQUEST REJECT req.ind
from FE within the private network
to ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCNR−T−Request return result)
to ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.3.1)
RELEASE (cCNR−T−Request return error)

Figure 9.2

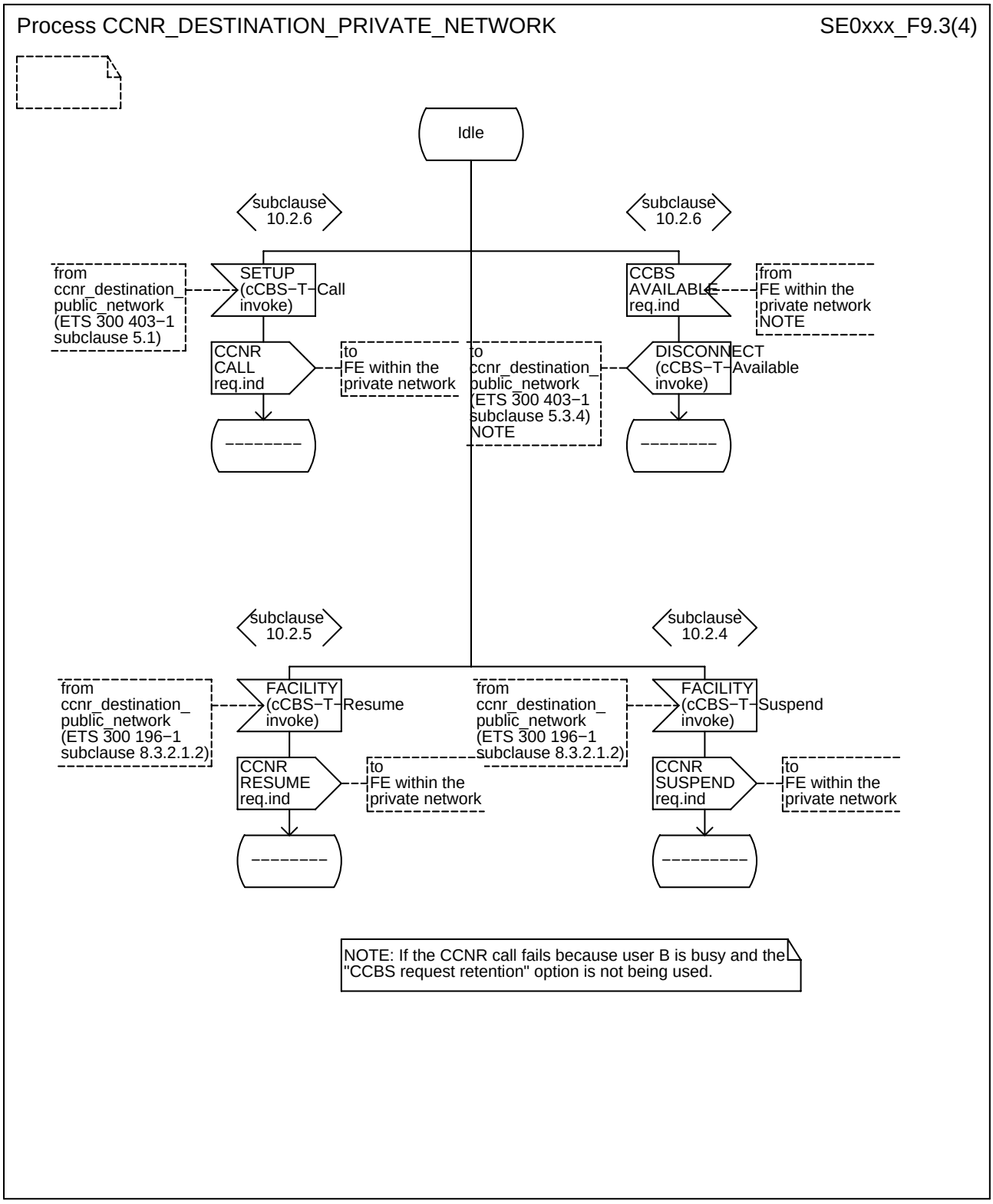

Process CCNR_DESTINATION_PRIVATE_NETWORK
SE0xxx_F9.3(4)
Idle
subclause 10.2.6
subclause 10.2.6
from ccnr_destination_ public_network (ETS 300 403−1 subclause 5.1)
SETUP (cCBS−T−Call invoke)
CCBS AVAILABLE req.ind
from FE within the private network NOTE
CCNR CALL req.ind
to FE within the private network
to ccnr_destination_ public_network (ETS 300 403−1 subclause 5.3.4) NOTE
DISCONNECT (cCBS−T−Available invoke)
subclause 10.2.5
subclause 10.2.4
from ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−Resume invoke)
from ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−Suspend invoke)
CCNR RESUME req.ind
to FE within the private network
CCNR SUSPEND req.ind
to FE within the private network
NOTE: If the CCNR call fails because user B is busy and the "CCBS request retention" option is not being used.

Figure 9.3

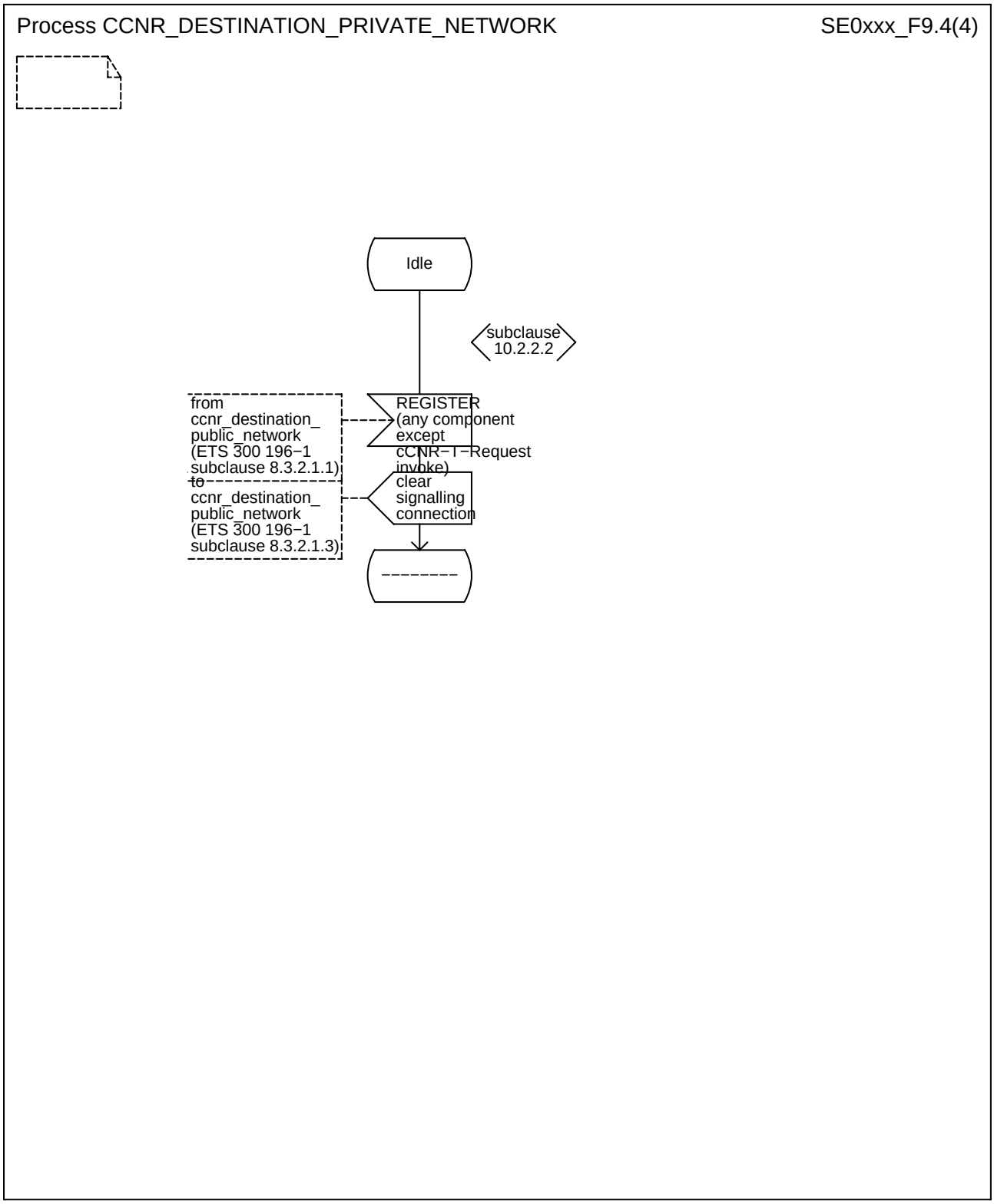

Process CCNR_DESTINATION_PRIVATE_NETWORK
SE0xxx_F9.4(4)
Idle
subclause 10.2.2.2
from ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.1)
to ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.3)
REGISTER (any component except cCNR−I−Request invoke)
clear signalling connection

Figure 9.4

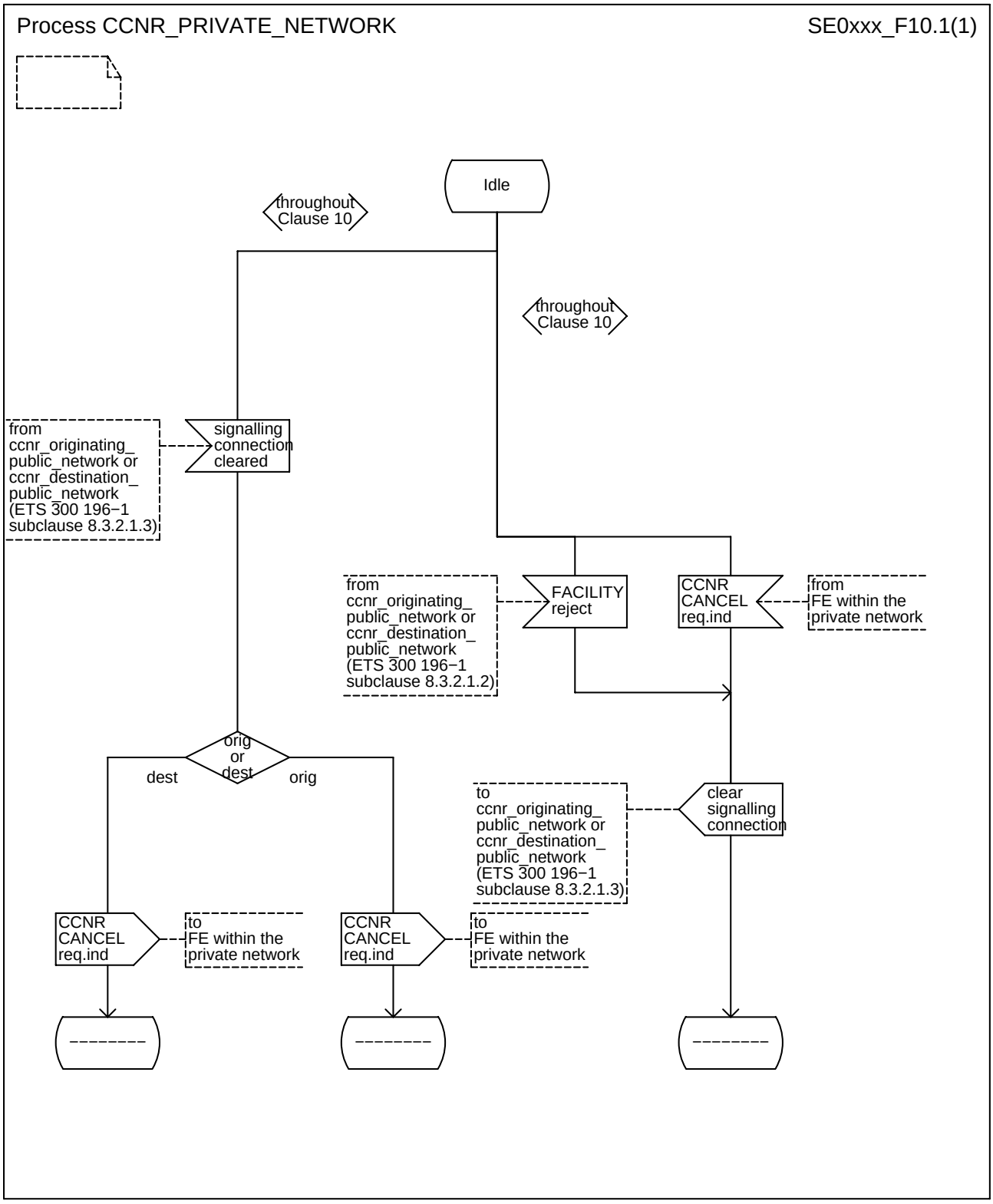

Process CCNR_PRIVATE_NETWORK
SE0xxx_F10.1(1)
Idle
throughout Clause 10
throughout Clause 10
from ccnr_originating_ public_network or ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.3)
signalling connection cleared
from ccnr_originating_ public_network or ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY reject
CCNR CANCEL req.ind
from FE within the private network
orig or dest
dest
orig
to ccnr_originating_ public_network or ccnr_destination_ public_network (ETS 300 196−1 subclause 8.3.2.1.3)
clear signalling connection
CCNR CANCEL req.ind
to FE within the private network
CCNR CANCEL req.ind
to FE within the private network

Figure 10

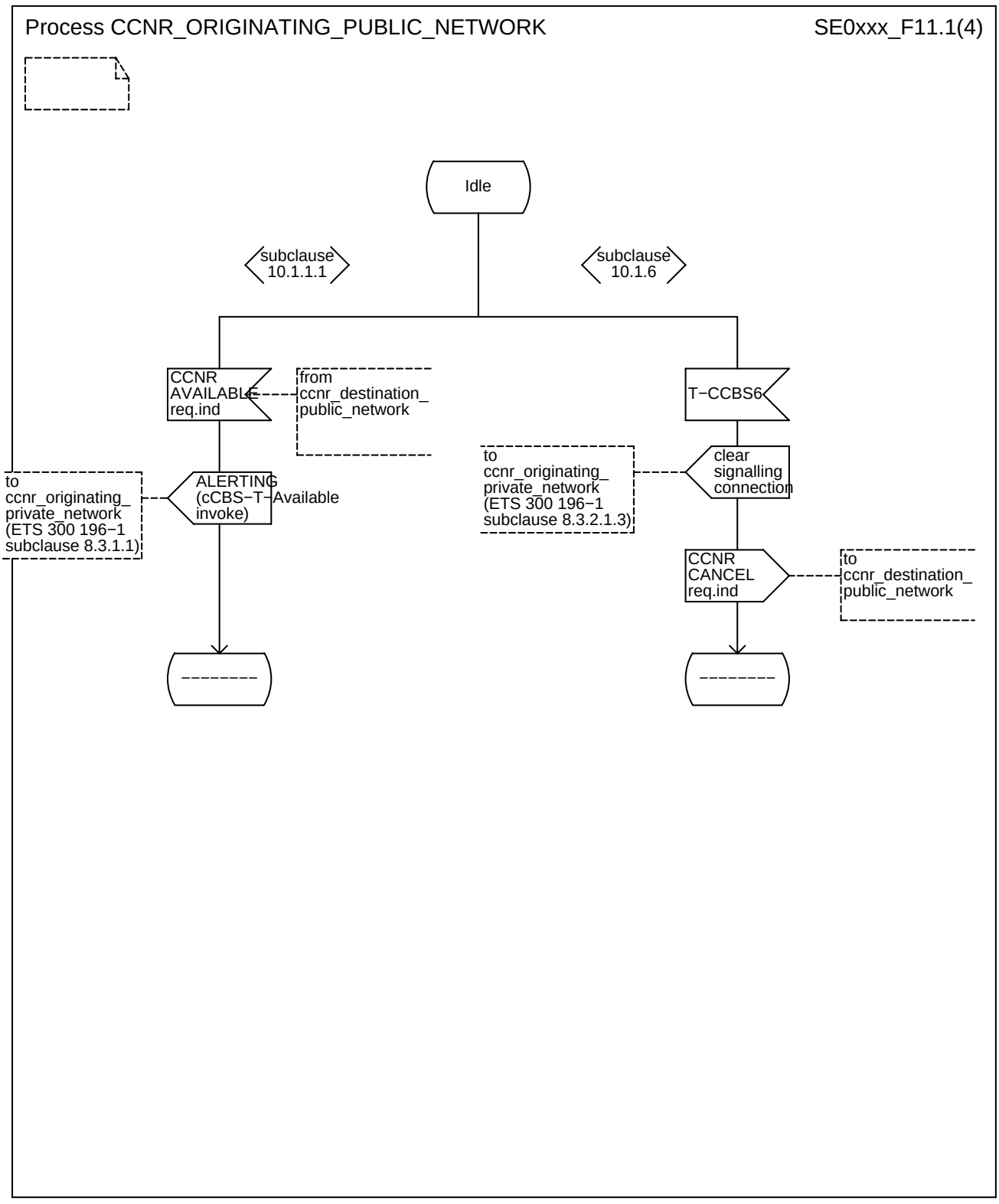

Process CCNR_ORIGINATING_PUBLIC_NETWORK
SE0xxx_F11.1(4)
Idle
subclause 10.1.1.1
subclause 10.1.6
CCNR AVAILABLE req.ind
from ccnr_destination_ public_network
T−CCBS6
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.1.1)
ALERTING (cCBS−T−Available invoke)
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.3)
clear signalling connection
CCNR CANCEL req.ind
to ccnr_destination_ public_network

Figure 11.1

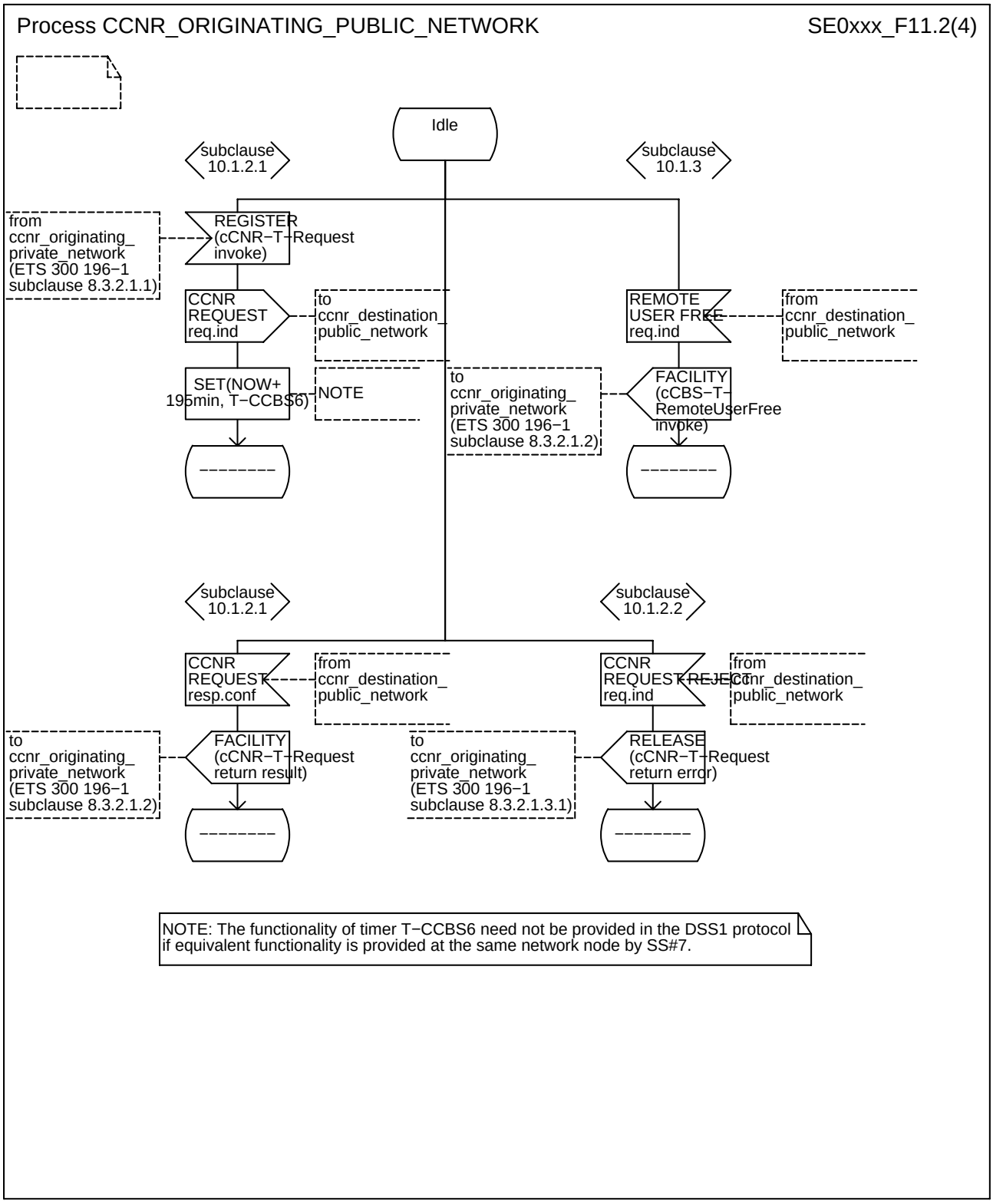

Process CCNR_ORIGINATING_PUBLIC_NETWORK
SE0xxx_F11.2(4)
Idle
subclause 10.1.2.1
subclause 10.1.3
from ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.1)
REGISTER (cCNR−T−Request invoke)
CCNR REQUEST req.ind
to ccnr_destination_ public_network
REMOTE USER FREE req.ind
from ccnr_destination_ public_network
SET(NOW+ 195min, T−CCBS6)
NOTE
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−RemoteUserFree invoke)
subclause 10.1.2.1
subclause 10.1.2.2
CCNR REQUEST resp.conf
from ccnr_destination_ public_network
CCNR REQUEST REJECT req.ind
from ccnr_destination_ public_network
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCNR−T−Request return result)
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.3.1)
RELEASE (cCNR−T−Request return error)
NOTE: The functionality of timer T−CCBS6 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network node by SS#7.

Figure 11.2

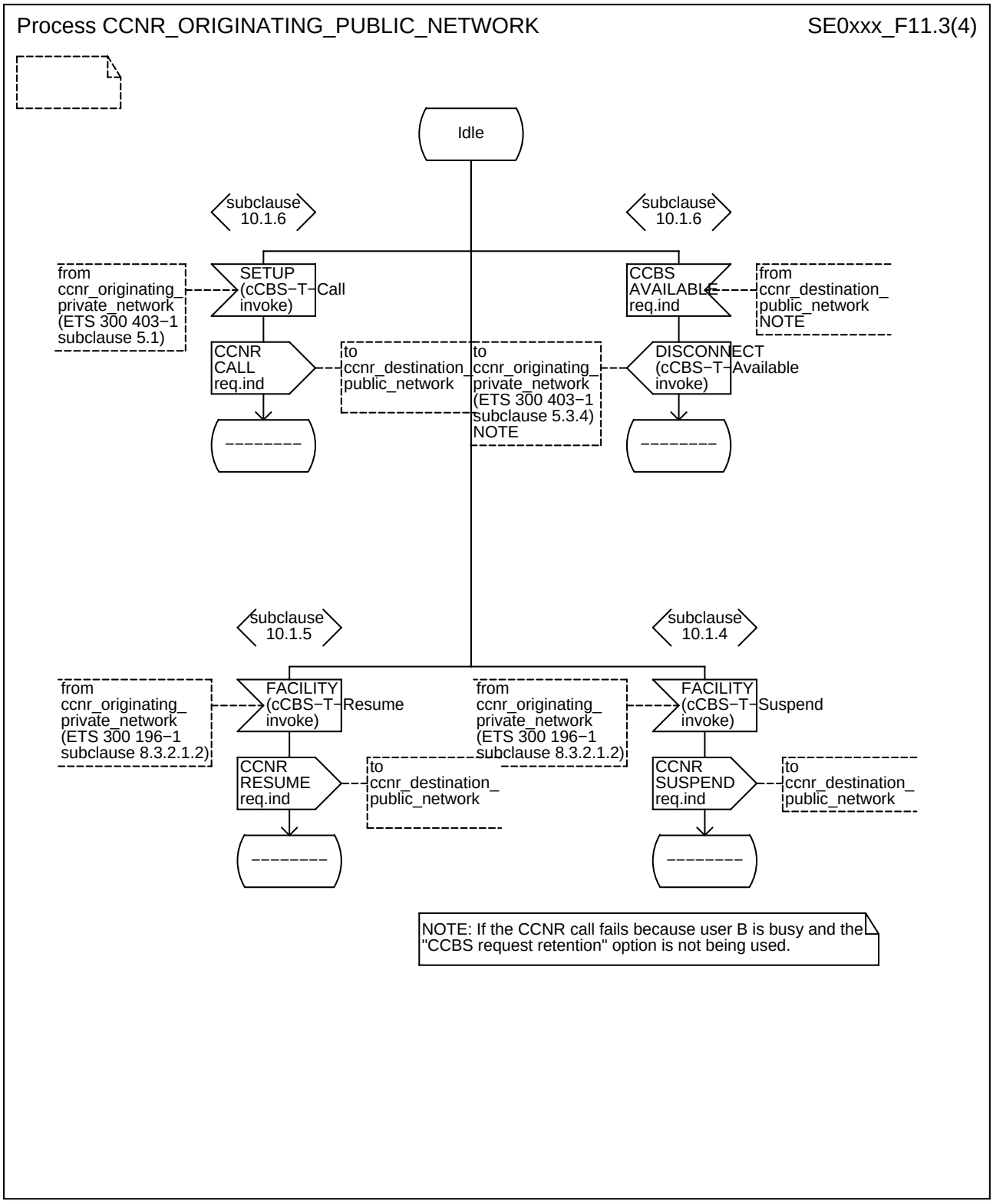

Process CCNR_ORIGINATING_PUBLIC_NETWORK
SE0xxx_F11.3(4)
Idle
subclause 10.1.6
subclause 10.1.6
from ccnr_originating_ private_network (ETS 300 403−1 subclause 5.1)
SETUP (cCBS−T−Call invoke)
CCBS AVAILABLE req.ind
from ccnr_destination_ public_network NOTE
CCNR CALL req.ind
to ccnr_destination_ public_network
to ccnr_originating_ private_network (ETS 300 403−1 subclause 5.3.4) NOTE
DISCONNECT (cCBS−T−Available invoke)
subclause 10.1.5
subclause 10.1.4
from ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−Resume invoke)
from ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−Suspend invoke)
CCNR RESUME req.ind
to ccnr_destination_ public_network
CCNR SUSPEND req.ind
to ccnr_destination_ public_network
NOTE: If the CCNR call fails because user B is busy and the "CCBS request retention" option is not being used.

Figure 11.3

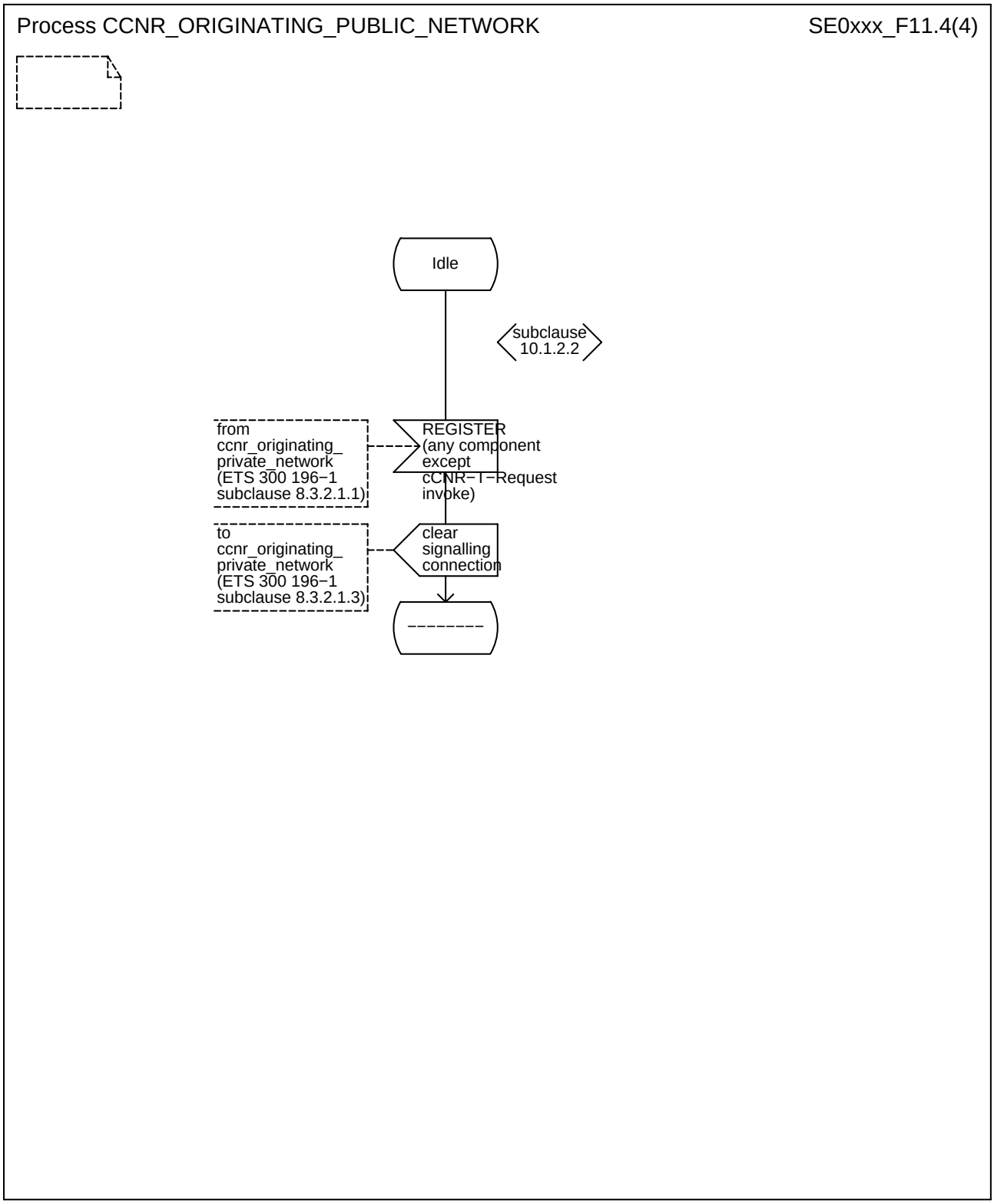

Process CCNR_ORIGINATING_PUBLIC_NETWORK
SE0xxx_F11.4(4)
Idle
subclause
10.1.2.2
from
ccnr_originating_
private_network
(ETS 300 196−1
subclause 8.3.2.1.1)
REGISTER
(any component
except
cCNR−T−Request
invoke)
to
ccnr_originating_
private_network
(ETS 300 196−1
subclause 8.3.2.1.3)
clear
signalling
connection

Figure 11.4

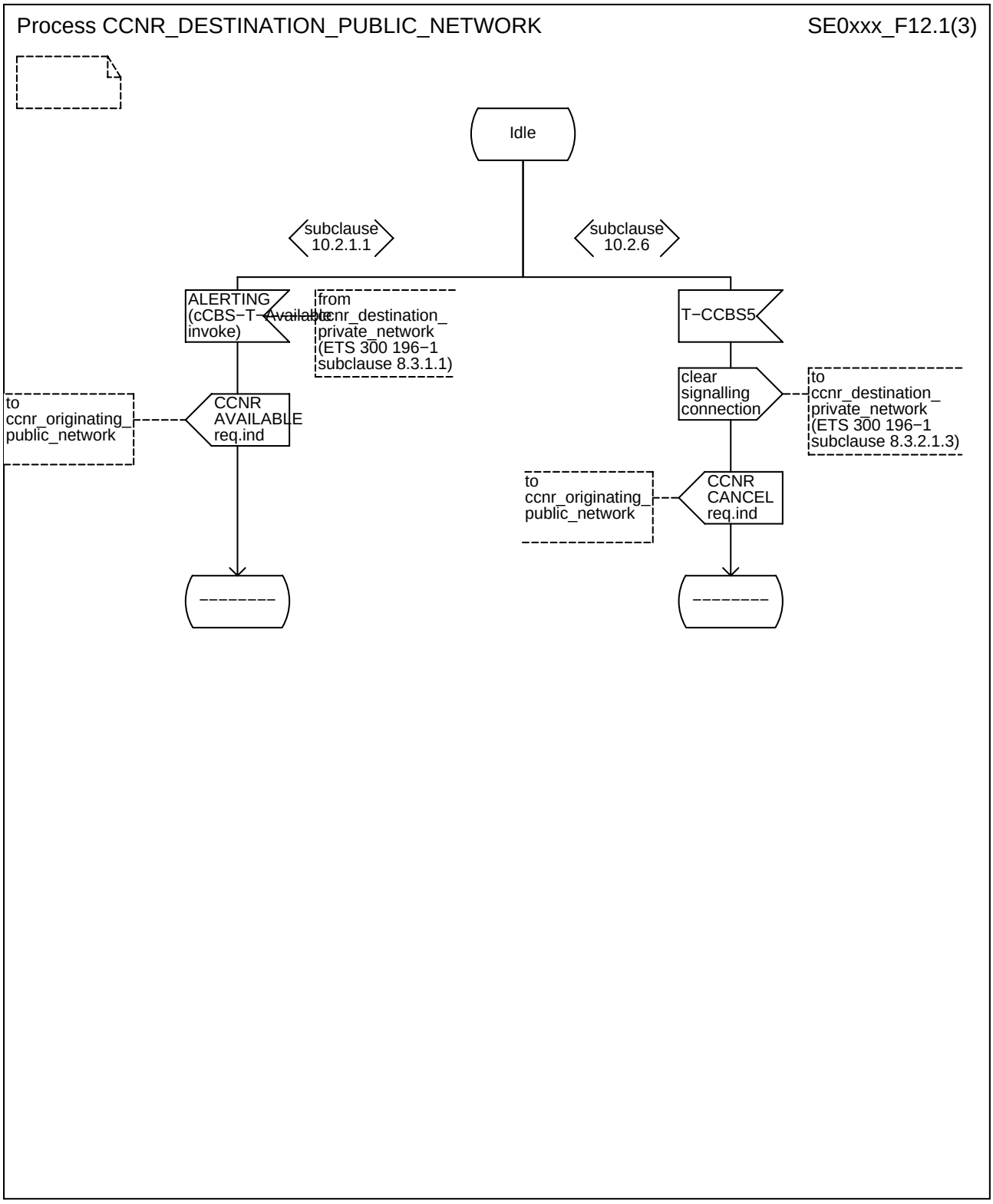

Process CCNR_DESTINATION_PUBLIC_NETWORK
SE0xxx_F12.1(3)
Idle
subclause 10.2.1.1
subclause 10.2.6
ALERTING (cCBS−T−Available invoke)
from ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.1.1)
T−CCBS5
clear signalling connection
to ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.3)
to ccnr_originating_ public_network
CCNR AVAILABLE req.ind
to ccnr_originating_ public_network
CCNR CANCEL req.ind

Figure 12.1

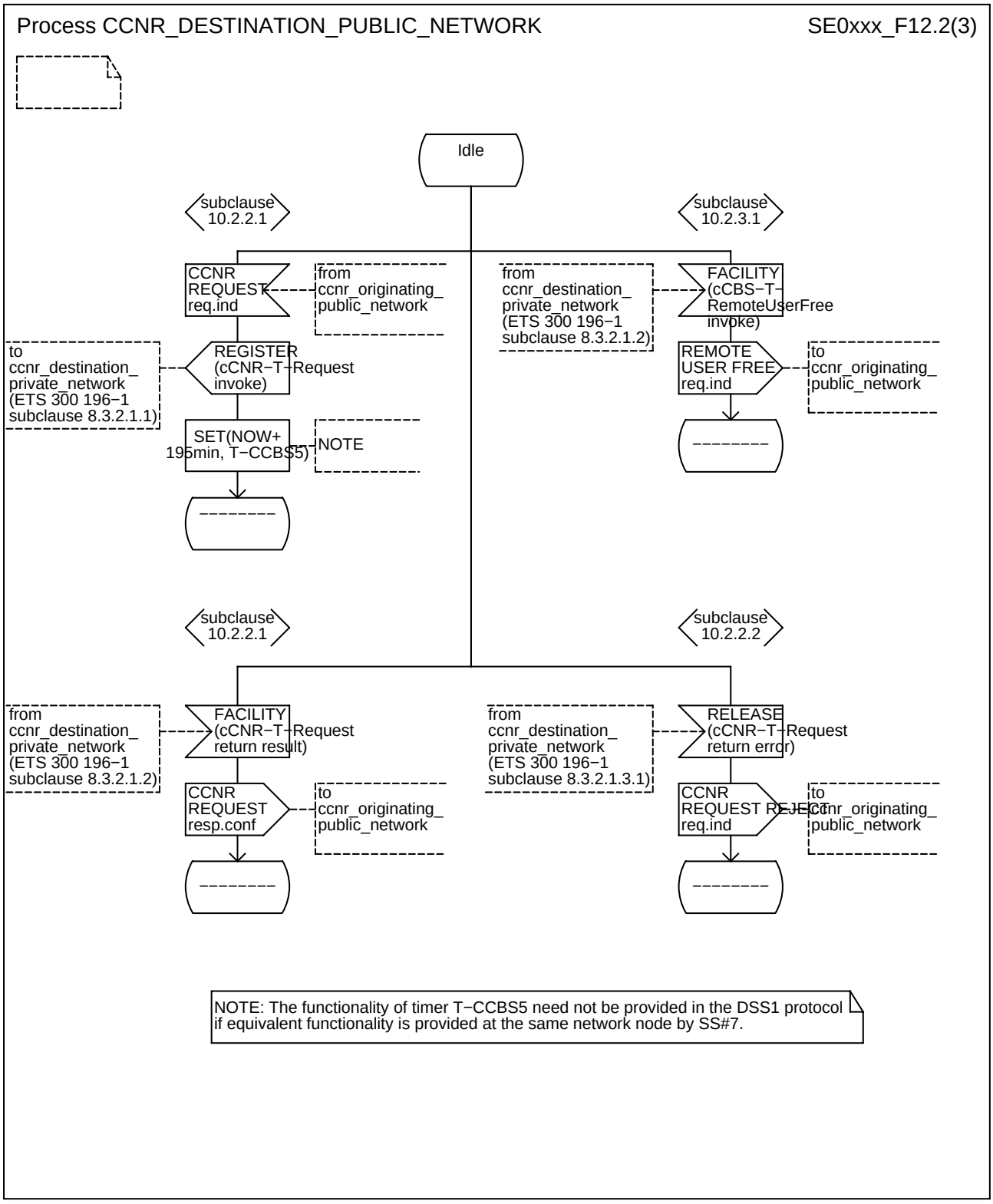

Process CCNR_DESTINATION_PUBLIC_NETWORK
SE0xxx_F12.2(3)
Idle
subclause 10.2.2.1
subclause 10.2.3.1
CCNR REQUEST req.ind
from ccnr_originating_ public_network
from ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T−RemoteUserFree invoke)
to ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.1)
REGISTER (cCNR−T−Request invoke)
REMOTE USER FREE req.ind
to ccnr_originating_ public_network
SET(NOW+ 195min, T−CCBS5)
NOTE
subclause 10.2.2.1
subclause 10.2.2.2
from ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCNR−T−Request return result)
from ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.3.1)
RELEASE (cCNR−T−Request return error)
CCNR REQUEST resp.conf
to ccnr_originating_ public_network
CCNR REQUEST REJECT req.ind
to ccnr_originating_ public_network
NOTE: The functionality of timer T−CCBS5 need not be provided in the DSS1 protocol if equivalent functionality is provided at the same network node by SS#7.

Figure 12.2

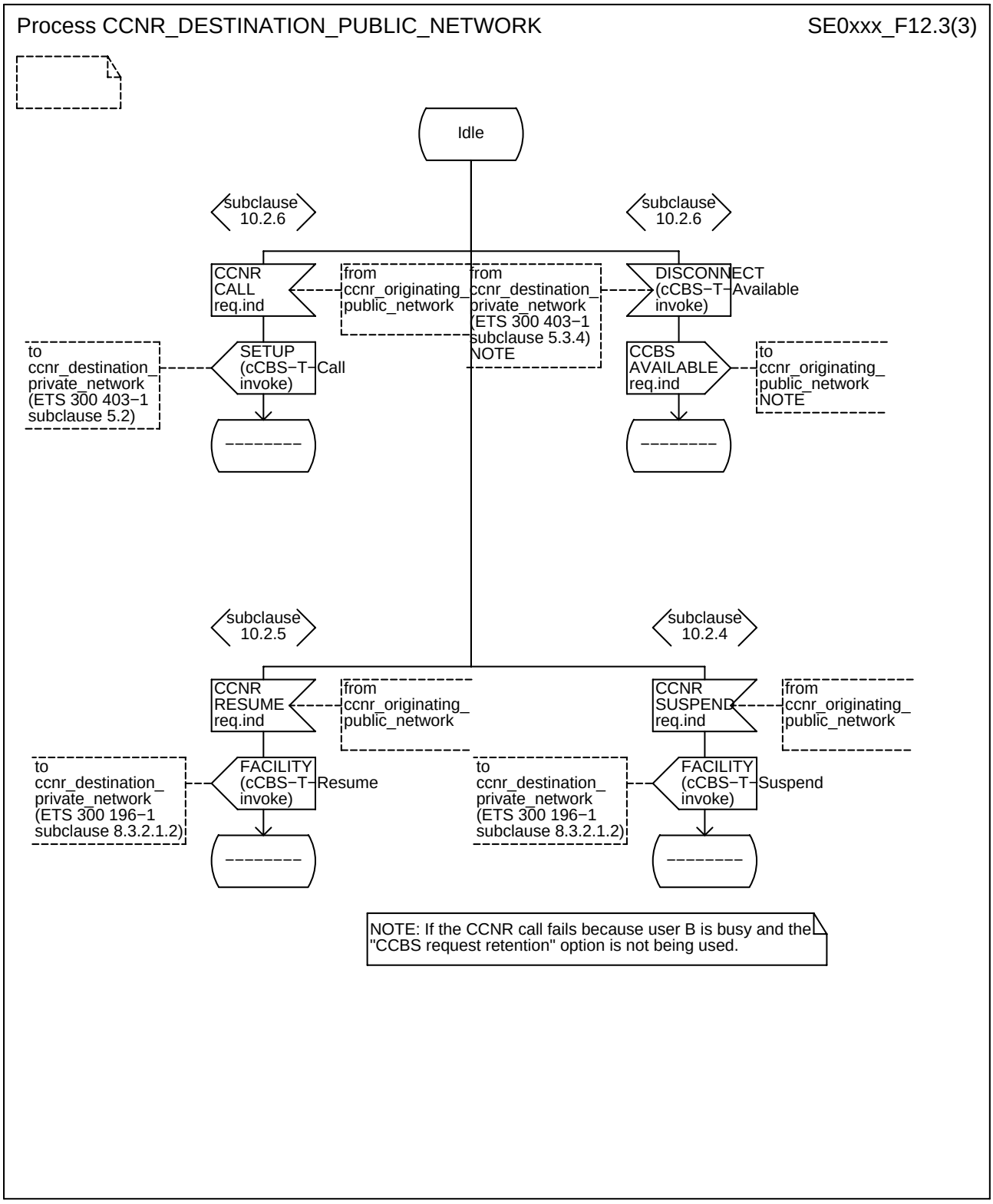

Process CCNR_DESTINATION_PUBLIC_NETWORK
SE0xxx_F12.3(3)
Idle
subclause 10.2.6
subclause 10.2.6
CCNR CALL req.ind
from ccnr_originating_ public_network
from ccnr_destination_ private_network (ETS 300 403−1 subclause 5.3.4) NOTE
DISCONNECT (cCBS−T Available invoke)
to ccnr_destination_ private_network (ETS 300 403−1 subclause 5.2)
SETUP (cCBS−T Call invoke)
CCBS AVAILABLE req.ind
to ccnr_originating_ public_network NOTE
subclause 10.2.5
subclause 10.2.4
CCNR RESUME req.ind
from ccnr_originating_ public_network
CCNR SUSPEND req.ind
from ccnr_originating_ public_network
to ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T Resume invoke)
to ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY (cCBS−T Suspend invoke)
NOTE: If the CCNR call fails because user B is busy and the "CCBS request retention" option is not being used.

Figure 12.3

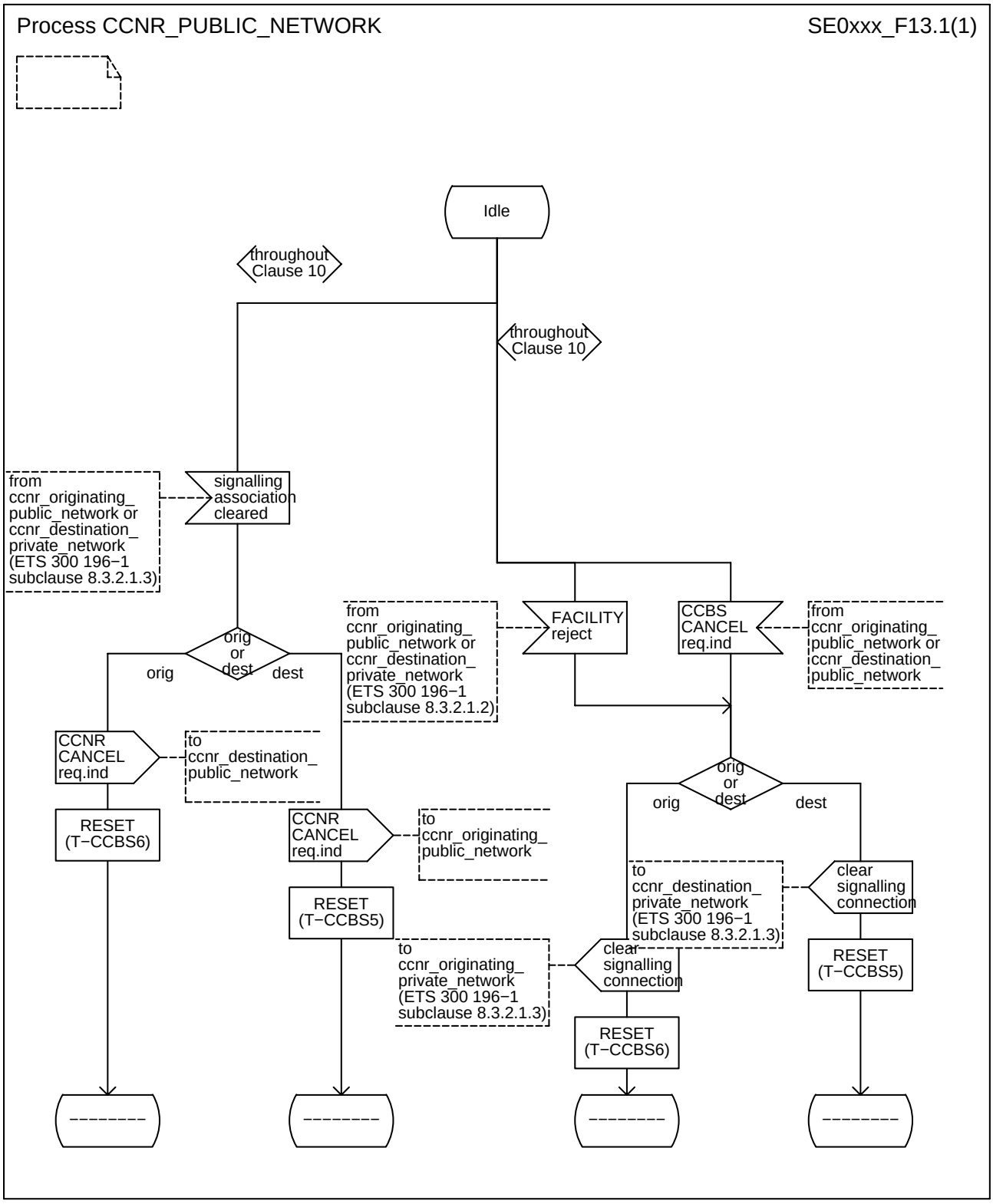

Process CCNR_PUBLIC_NETWORK
SE0xxx_F13.1(1)
Idle
throughout Clause 10
throughout Clause 10
from ccnr_originating_ public_network or ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.3)
signalling association cleared
orig or dest
orig
dest
from ccnr_originating_ public_network or ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.2)
FACILITY reject
CCBS CANCEL req.ind
from ccnr_originating_ public_network or ccnr_destination_ public_network
CCNR CANCEL req.ind
to ccnr_destination_ public_network
RESET (T−CCBS6)
CCNR CANCEL req.ind
to ccnr_originating_ public_network
RESET (T−CCBS5)
orig or dest
orig
dest
to ccnr_destination_ private_network (ETS 300 196−1 subclause 8.3.2.1.3)
clear signalling connection
RESET (T−CCBS5)
to ccnr_originating_ private_network (ETS 300 196−1 subclause 8.3.2.1.3)
clear signalling connection
RESET (T−CCBS6)

Figure 13

Annex A (informative): CCNR signalling flows

This annex contains the signalling flows for the different cases of the CCNR supplementary service:

Figure A.1: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", specific recall, user A free.
Figure A.2: Specific recall, CCNR request during the alerting phase, user A busy.
Figure A.3: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", global recall, at least one user A free.
Figure A.4: Global recall, CCNR request during the alerting phase, user A busy.
Figure A.5: CCNR deactivation by user A.
Figure A.6: CCNR deactivation by the network.
Figure A.7: Normal operation, originating private ISDN.
Figure A.8: User A busy, originating private ISDN.

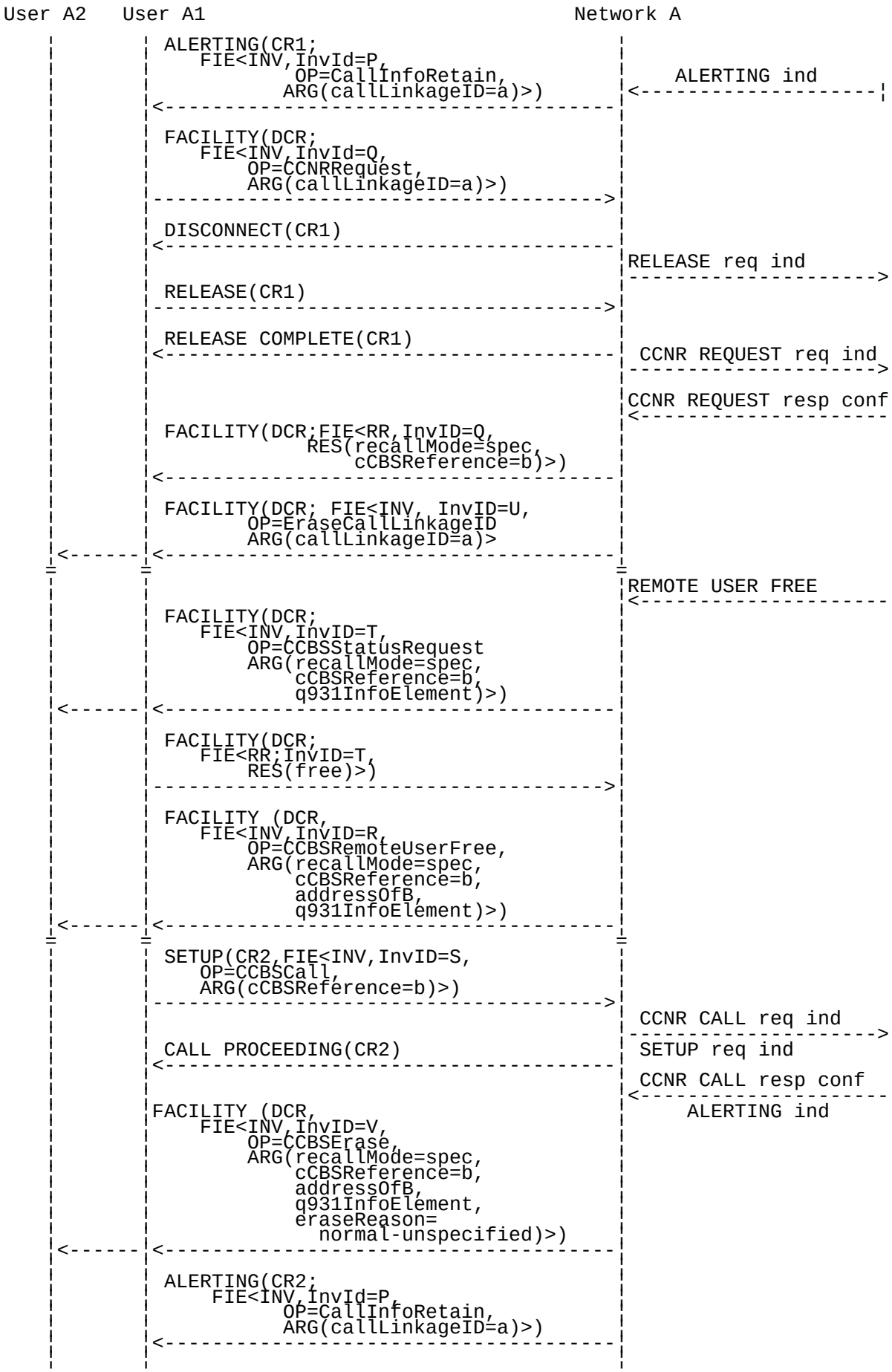


Figure A.1: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", specific recall, user A free

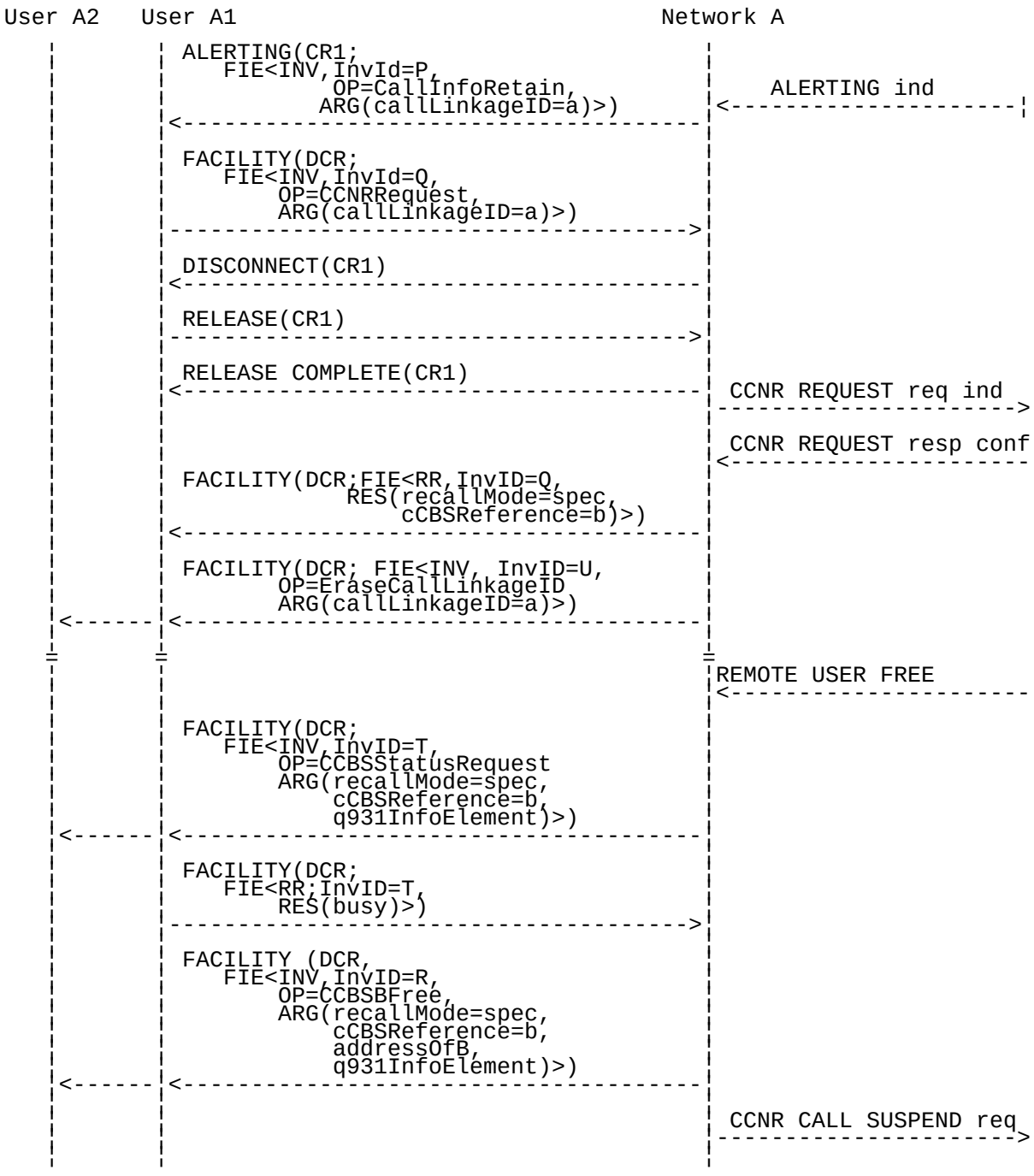


Figure A.2: Specific recall, CCNR request during the alerting phase, user A busy

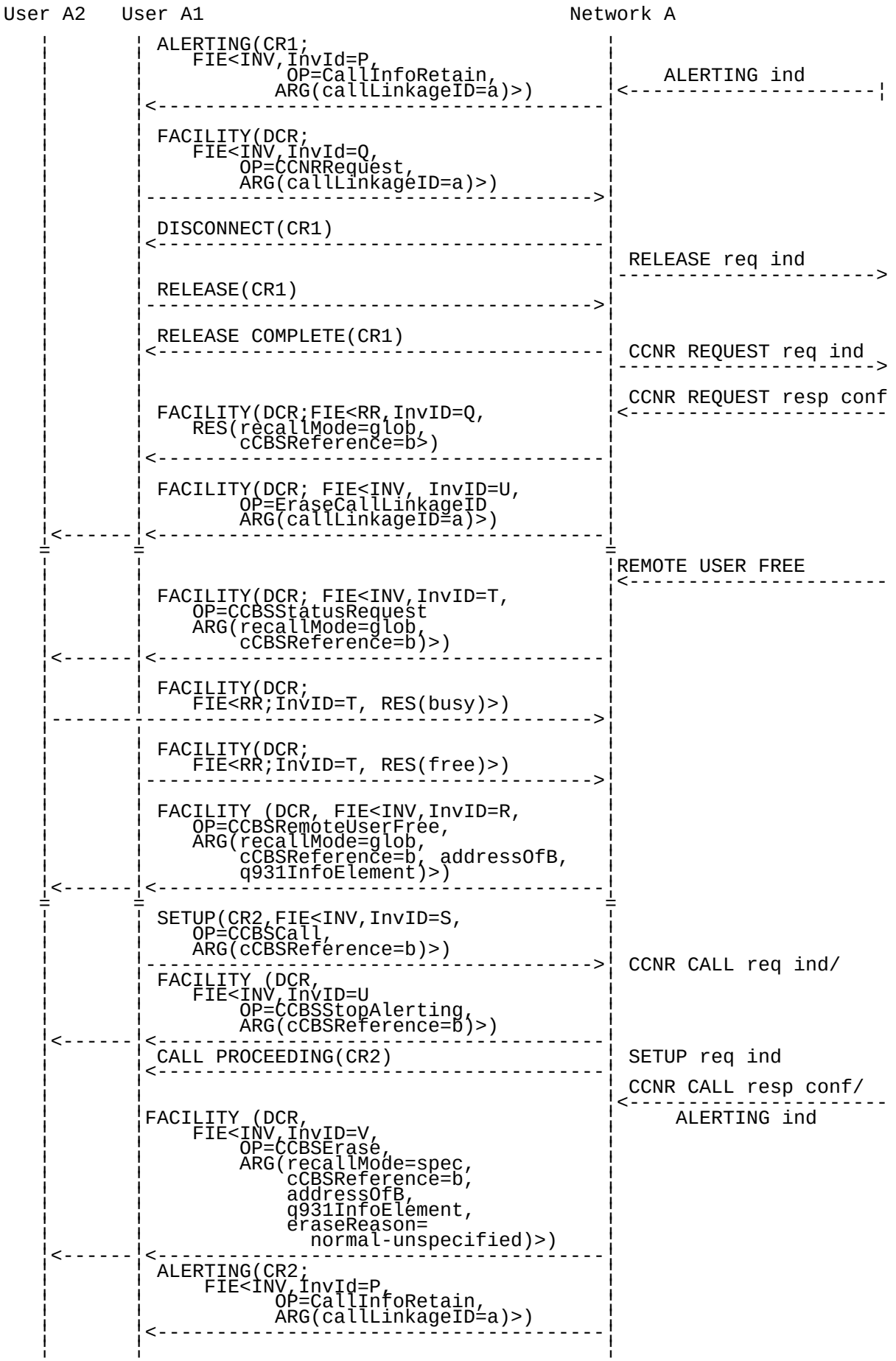


Figure A.3: Normal operation, CCNR request during the alerting phase, "CCBS request retention" option is set to "no", global recall, at least one user A free

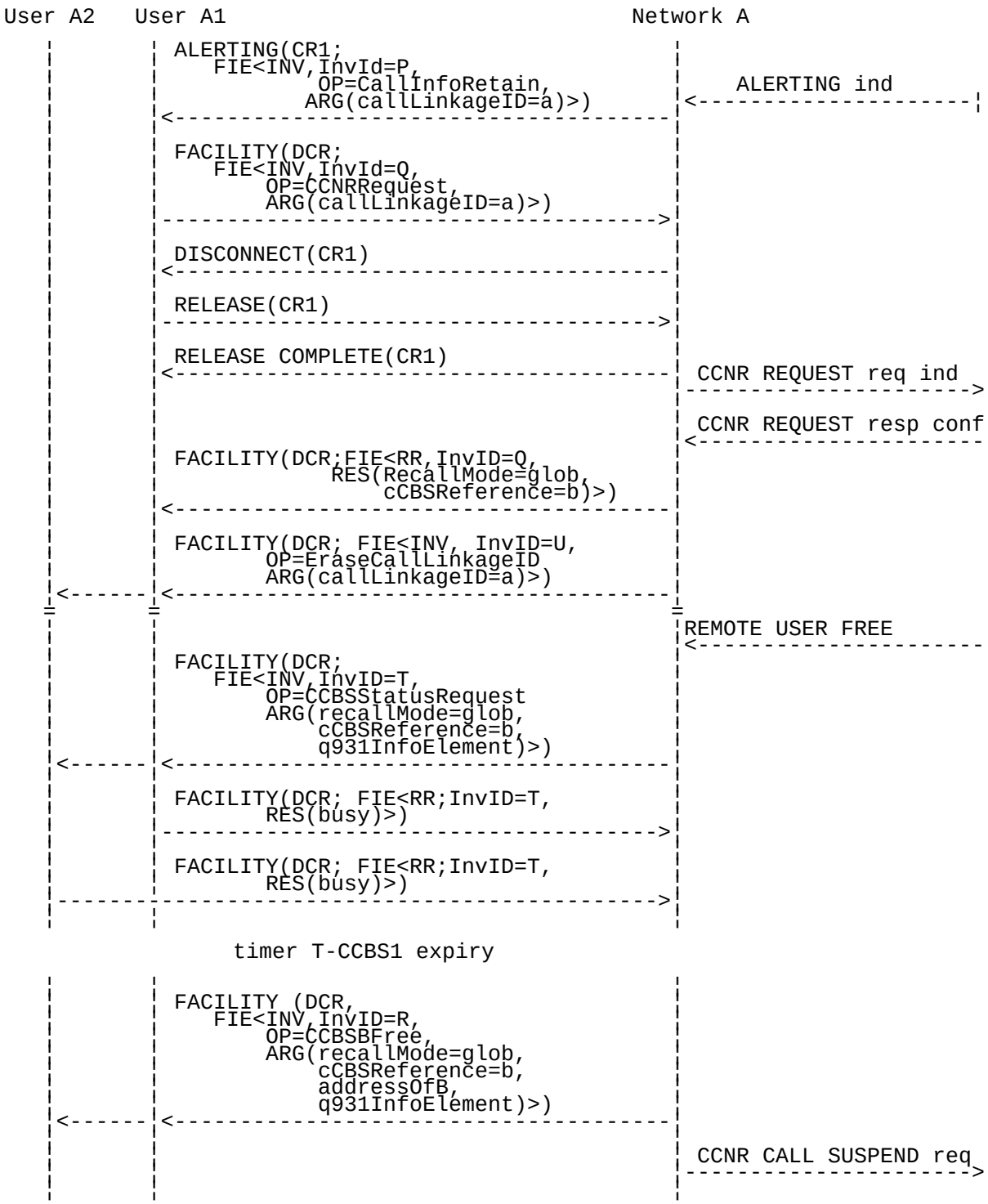


Figure A.4: Global recall, CCNR request during the alerting phase, user A busy

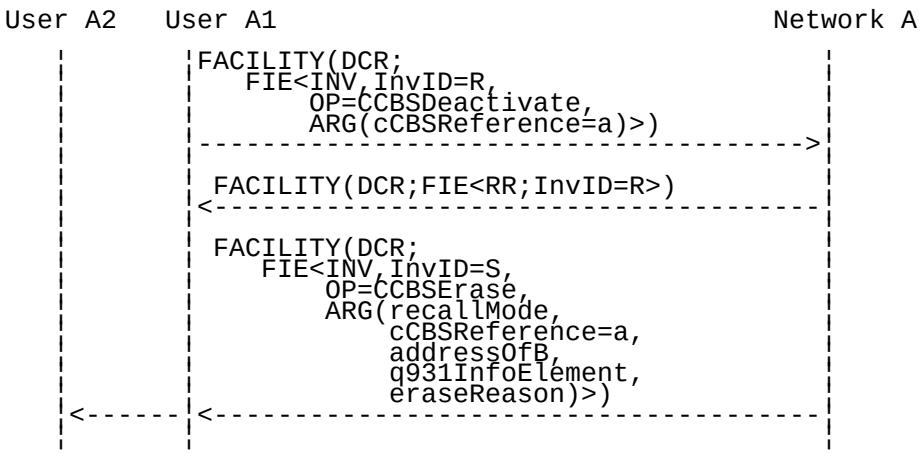


Figure A.5: CCNR deactivation by user A

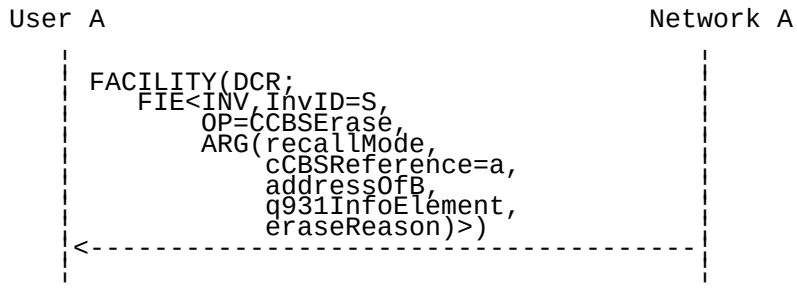


Figure A.6: CCNR deactivation by the network

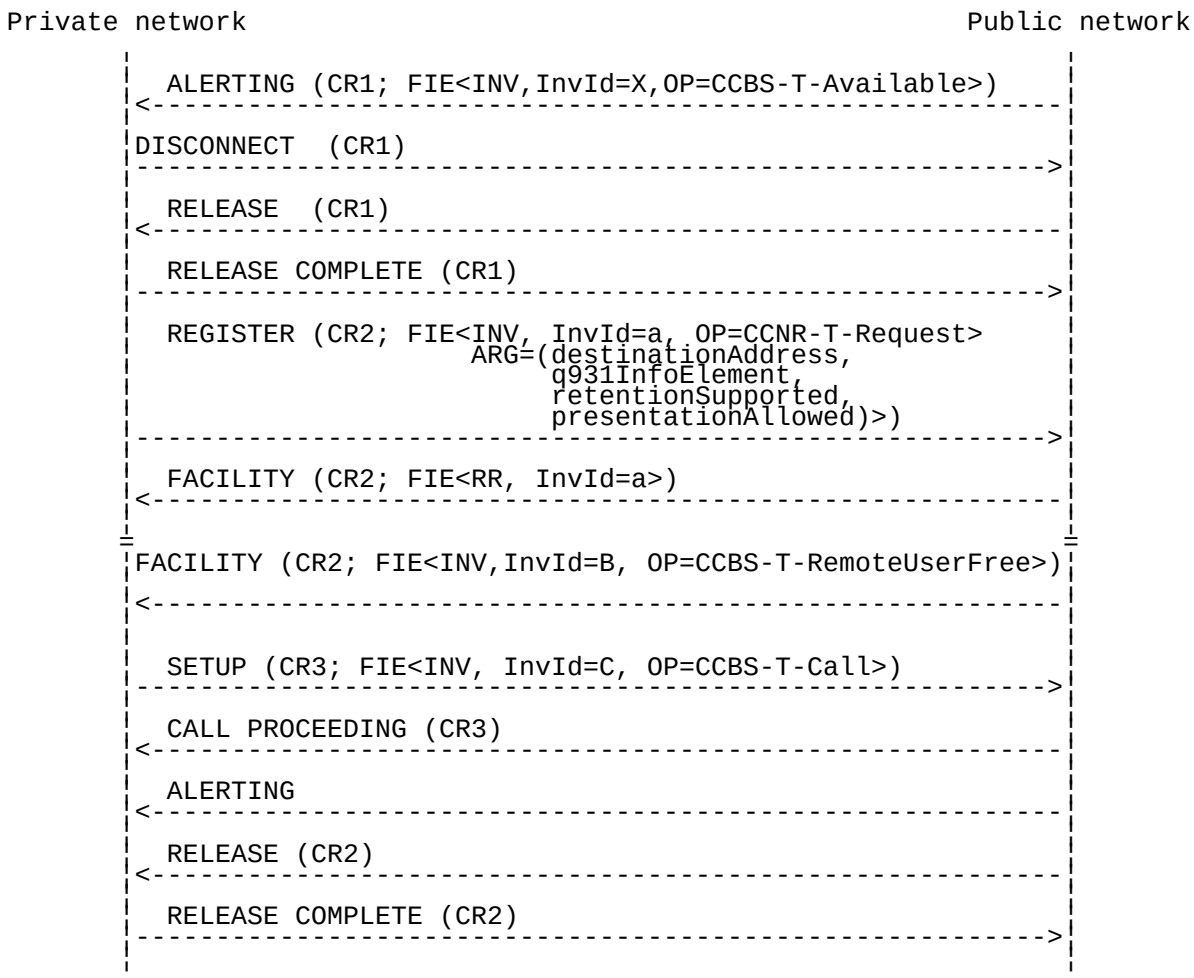


Figure A.7: Originating private ISDN (normal operation)

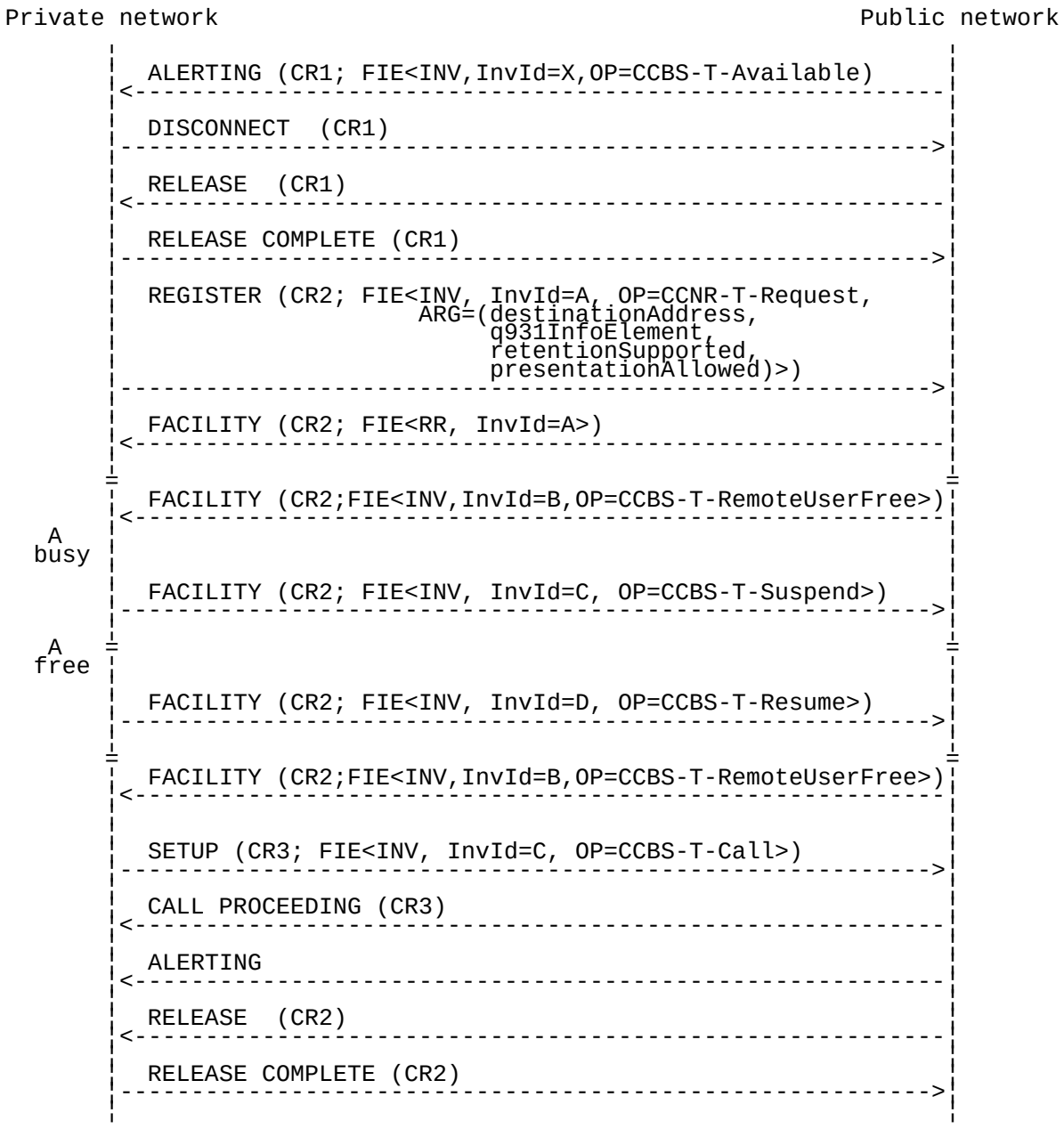


Figure A.8: Originating private ISDN (user A busy)

Annex B (normative): Provision of status request procedures

See annex B of EN 300 359-1 [15].

Annex C (informative): Assignment of object identifier values

The following object identifier values are assigned in the present document:

{ccitt identified-organization etsi(0) 1065 operations-and-errors(1)}

{ccitt identified-organization etsi(0) 1065 operations-and-errors(1) 1}

{ccitt identified-organization etsi(0) 1065 operations-and-errors(1) 2}

{ccitt identified-organization etsi(0) 1065 private-networks-operations-and-errors(2)}

{ccitt identified-organization etsi(0) 1065 private-networks-operations-and-errors(2) 1}

History

Document history				
V1.1.1	December 1997	Public Enquiry	PE 9815:	1997-12-12 to 1998-04-10
V1.2.1	August 1998	Vote	V 9840:	1998-08-04 to 1998-10-02
V1.2.2	October 1998	Publication		

ISBN 2-7437-2588-5
Dépôt légal : Octobre 1998